IRON AGE

DECEMBER 20, 1951
VOL. 168, No. 25

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Editorial, Advertising and Circulation Offices, 100 E. 42nd St., N. Y. 17, N. Y.

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TOM C. CAMPBELL, Editor

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DIGEST

of the week in metalworking

GETTING SCRAP FROM STEEL SLAG PILES

Like the meatpackers who use everything but the pig's squeal, steelmakers are not missing any bets for the recovery of everything useable from a melt of steel. Since the stress is now on scrap steel, steel producers are paying more attention to slag piles to recover more and more scrap metals.

HUNT FOR MINERALS KNOWS NO BOUNDARIES

The heartbeat of mining for minerals and metals is becoming stronger. Tonic for expanding production both here and overseas is being administered by Defense Minerals Procurement Agency. DMPA centralizes widely scattered authority for minerals and is able to issue attractive contracts.

U. S. SHIPPING BOOM HAS ITS WORRIES, TOO

Abnormal conditions and government subsidies are needed to keep American shipping healthy. High operating costs prevent real competition with foreign carriers. Many sources feel the cost isn't worth it, but others point to defense needs. Busy shipyards also worry about the future.

OPEN MACHINE TOOL RESERVE AT FORD

Machine tool reserves at Ford Aircraft Engine Div., at Chicago, were opened to Air Force contractors. More than 300 representatives from 44 states found the pickings lean but some had success stories to tell. Of the 10,500 machines stored at the old Dodge plant only 1000 remained.

STEELWORKERS DECLARE INTENT TO STRIKE

The CIO United Steel Workers declared intent to strike if steel did not offer a "fair" contract. Washington is moving deeper into steel labor contract negotiations so that it can avert or postpone a strike with no time or steel lost. Two government mediators conferred with both factions.

SEES DEEPER CUTS IN DETROIT EMPLOYMENT

Additional employment cuts are coming with no relief promised before the end of the second quarter, Defense Mobilizer Wilson said in a New Orleans speech recently. Union officials say more than 100,000 workers are now idle in Detroit and further slicing of employment rolls is expected.

MACHINE TOOLS SHARE TOP PRIORITY

PAGE 85

Although the super-priority promised by Washington has not been granted, machine tools now at least share star billing on materials preference with AEC and the military. This equality was achieved by issuance of the new Z-2 rating. Shortages crippling output are in bearings and plate.

ALLOYS ARE FLASH WELDED AUTOMATICALLY

PAGE 95

Preset machines flash-butt weld aircraft landing gear tubing. Materials are 4130, 4140, 4340, and similar steel. Quality control test specimens show as low as 2.1 pct failure. Areas of these welds range from 0.025 up to 23 sq in. This process saves from 40 to 60 pct welding operation time.

STAMPING PLANT FEATURES MECHANIZATION

PAGE 100

Maximum use is made of automatic loading, unloading, turnover, and other handling devices at Fisher Body's Hamilton plant. On continuous press lines for large door panels, for example, no operator has to lift, turn, or invert a panel. Much of equipment is Fisher designed and built.

SPECIAL MACHINE SHAVES 200-IN. GEARS

PAGE 106

Gears up to 200 in. in diam and 60-in. face width are shaved in regular production by De Laval Steam Turbine Co. The accumulated error on gears with over 600 teeth is only a few ten-thousandths of an inch. A standard Michigan gear shaver had been modified to handle these huge gears.

HOPES FOR STEEL PEACE GROWING DIMMER

PAGE 129

Overnight steel users and steel producers have taken a dim view of hopes for quick settlement of the steel wage-price impasse. Customers are putting on renewed pressure to get steel tickets cashed. Some feel that public statements of Washington officials may have prejudiced the bargaining.

HOW A NEW DEFENSE PLANT TOOLED UP FAST

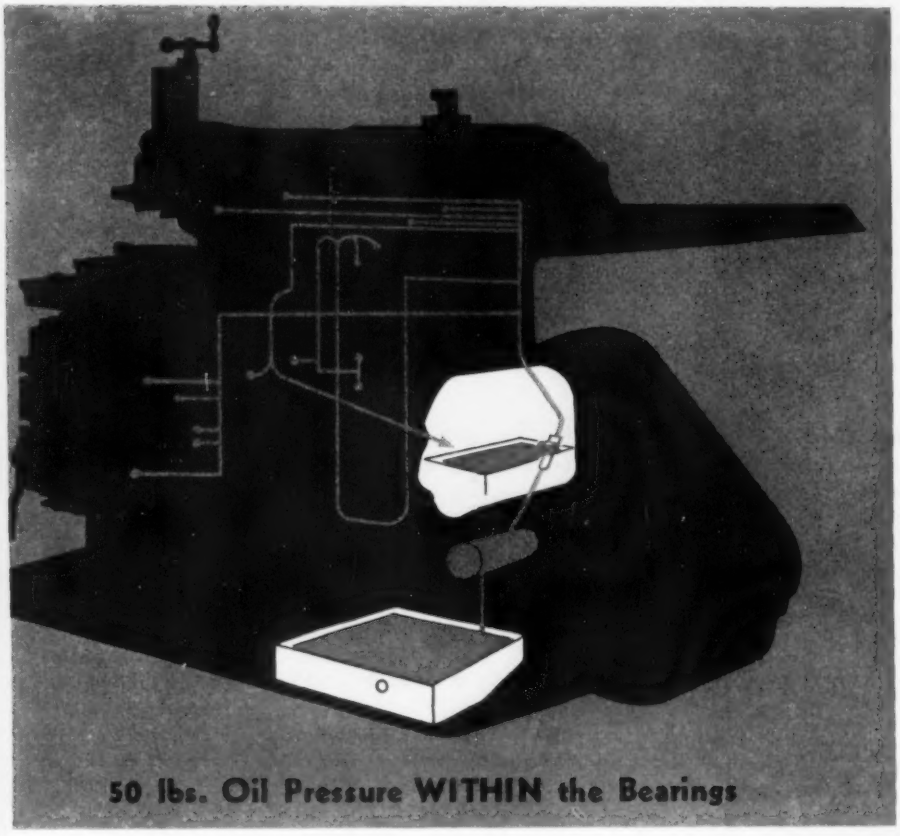
NEXT WEEK

Some 70 pct of the machine tools in this tank drive plant are used. New tool orders avoided hard-to-get types of tools as much as possible. Though this policy has resulted in unusual applications, they do the job. And months were saved in getting this Chevrolet plant into operation.

–another Cincinnati Exclusive Feature!

50 lbs. Oil Pressure

maintained in running bearing surfaces



50 lbs. Oil Pressure WITHIN the Bearings

For the first time in the shaper field, bearings on a shaper operate under a positive 50 lbs. oil pressure within the bearings.

Even the most inaccessible bearings of the Cincinnati rocker arm and crank block assemblies operate under a positive pressure oil supply. For the first time, inefficient lubrication by dripping or spraying oil on these bearing surfaces is replaced by full pressure lubrication.

Wear and friction are reduced to a minimum giving Cincinnati Shapers extra years of maintained accuracy and maximum power at the cutting tool.

The system is fully automatic, saves the operator time and is insurance against oiling failures.

Write for Catalog N-5, fully describing these versatile, powerful and productive Cincinnati Shapers.

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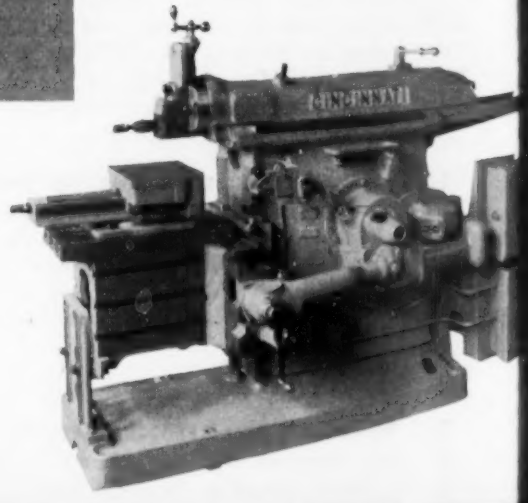
1. Cincinnati Electro-Magnetic Clutch
2. Cincinnati Multiple-Cam Feeds
3. Cincinnati Single Adjustment Tapered Gibs.
4. Cincinnati Extended Solid Ram Bearings
5. Cincinnati Dovetail Crank Block and One-piece Crank Gear.
6. Cincinnati Protected Table Support.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

The Iron Age
FOUNDED 1855

It Just Isn't So!

FOR months on end people in the scrap business have been bursting blood vessels to get scrap to steel mills. Everyone from broker to the junk peddler and his kids have done a most excellent job.

Then there are the steel companies who have spent money galore advertising how badly they need scrap. They have used their sales forces to open up new sources and they have dinned the need into the ears of their customers.

Warehouses have had drives, games and contests to make their customers scrap conscious. They have succeeded, too. The results so far have made it possible to keep the steel ingot mills and the foundries going.

Then we have Bob Wolcott, board chairman of Lukens Steel Co., who lives, breathes and eats scrap. He has given of his time unstintingly and has barnstormed the U. S. A. to tell industry of the great need for its dormant scrap.

We have thousands and thousands of the "unknowns" who, although dealing in scrap for profit, have added that little extra effort because they know their country must have it.

How uncalled for then is the remark of Manly Fleischmann: "If industry does not get the scrap the government will." The government can no more get the scrap than it can make miners work when they don't want to work. This is not a Gestapo country.

But what burns up the industrialists—railroad people, manufacturers and all kinds of businessmen who have really furnished scrap—is that of all people the government has fallen down on scrap in its own bailiwick.

How about some of the old cargo boats? How about the ingots that are to be shipped out of the country? How about battlefield scrap? How about scrap from Germany to be redirected to England? How about scrap the Navy, Army and Air Force has held and which is just now starting to show up.

It just isn't true that industry has been lax on the job. Neither is it right to support, insinuate or help along rumors that scrap people are not doing the best job possible. What we need is scrap and not threats.

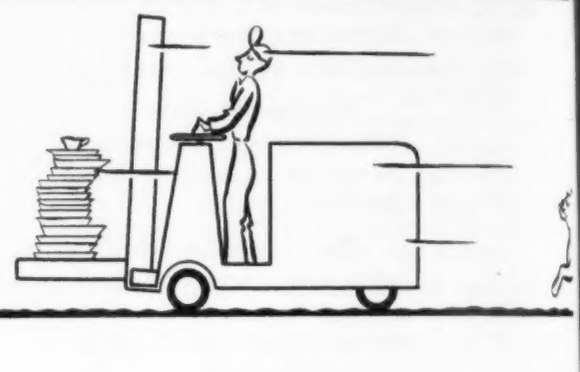
Tom Campbell

Editor

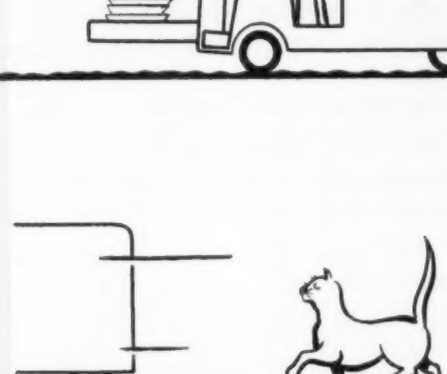
easy on loads
Mono-Cushions smooth out bumps, lend stability, reduce load breakage and spillage.

easy on drivers
Mono-Cushions steer easily, ride easily, handle beautifully, greatly reducing driver fatigue.

easy on vehicles
Mono-Cushions fairly soak up shock and shock load, reduce maintenance as much as 40%.



easy on floors
Easy-going Mono-Cushions roll gently, silently, over floor surfaces, reduce floor maintenance.



Mono-Cushions cut the cost of bumps

The manufacturer of your equipment can supply you, through his distributors, with Monarch Tires engineered for your equipment.

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SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS

Dear Editor:

Letters from readers

Round We Go

Sir:

We read the editorial "Round We Go" in your Nov. 15 issue with great pleasure.

Would you be good enough to give us permission to print it in a publication we put out for those who make our products.

V. WITT

The Parker Pen Co.
Janesville, Wis.

Boron Steels

Sir:

We have found your series of articles on boron steels exceedingly helpful in getting started with this alloy material.

I should like to know where to obtain some type of authentic listing of boron steel designations with analysis ranges which is as nearly up to date as possible. For old type alloys, we can look them up according to SAE or AISI numbers in the various handbooks.

I do not know whether work on the boron steels has progressed to the point where listings have been made. We have on hand voluminous material from the SAE Detroit meetings but a convenient listing for reference would be helpful.

M. L. SAMUELS

U. S. Pipe & Foundry Co.
Burlington, N. J.

We have attached our recent listing of boron steels. A list of the newer steels will appear in our Dec. 27 issue.—Ed.

Confidential

Sir:

On the Newsfront page of your Nov. 22 issue mention is made of a new process for the treatment of waste pickle liquor. I am wondering if you can give us any information respecting details or refer us to the proper company.

This is a problem which is being investigated under the auspices of the State of Ohio.

C. E. MacQUIGG
Dean and Director

Ohio State University
Columbus

We have received a tremendous number of inquiries on this news item but we are sorry that we cannot release any further information at the present time. As soon as we receive clearance from the maker we will publish the additional information.—Ed.

AMS 5041

Sir:

We are at present engaged in a government contract under which one of the steels specified is that conforming to AMS Specification No. 5041. To date our efforts to obtain this steel from numerous sources have proved futile.

The thought occurred to us that, with your wide range of contacts in this field through the publication of THE IRON AGE, you might be able to supply us with names of steel mills or warehouses who would be able to supply us with this stock.

This steel is to be used in a blow-out dome and must conform absolutely to this specification. The required thickness, according to our calculations, is 0.012 in. Initially we would require 700 ft of 12 in. strip of this material.

J. T. DUNNE
Projects Engineer

Spacarb Inc.
Stamford, Conn.

Any carbon steel producer should be able to make this. Perhaps it would help if you would include the specifications which are: 0.08 max. C, 0.2-0.4 Mn, 0.04 max. P, 0.05 max. S; sheet, strip, deep drawing—cold-rolled. This and similar data on government specifications will appear in our Jan. 3, 1952 issue.—Ed.

Can You Help?

Sir:

Can you tell us where we might obtain a set of tables of circumferences for given diameters with all of the measurements given in feet, inches and fractions? We are, of course, familiar with the tables given in the various warehouse and steel mill catalogs, which are either given in decimals or only cover a range up to 10 ft.

J. J. REICH

Reich-Huntington Iron Works
Huntington, W. Va.

Perhaps one of our readers may be able to help you.—Ed.

Servomechanisms

Sir:

On p. 205 of your Dec. 6 issue you make reference to a recent study by S. P. Higgins, Jr., and G. W. McKnight on the subject of servomechanisms.

Can you kindly inform us from whom we can secure a copy of this study.

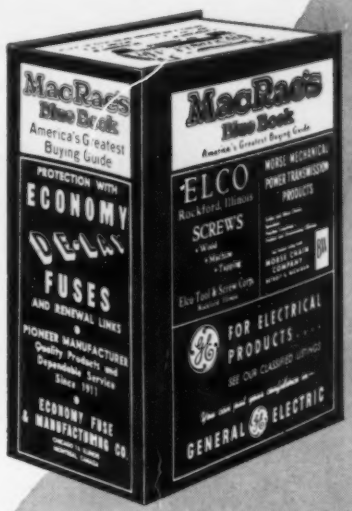
J. J. ROCHLIS

Blair, Rollins & Co., Inc.
Philadelphia

This study was based on an Instrument Society of America paper No. 51-8-2 presented Sept. 12, 1951, at Houston. It has been reprinted by Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia 44, Pa.—Ed.

America's Greatest Buying Guide

59th edition being compiled. A space order now will assure a choice position.



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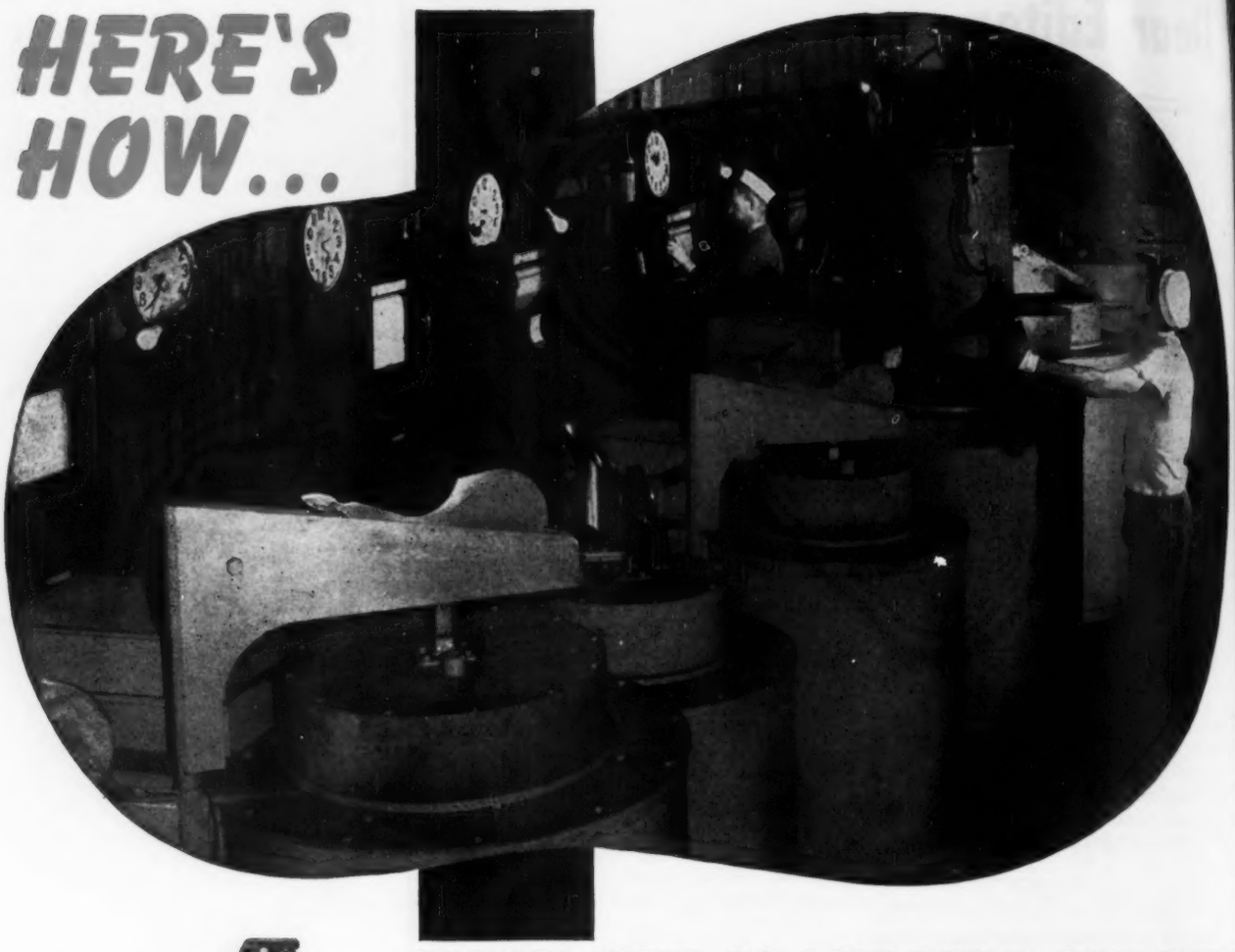
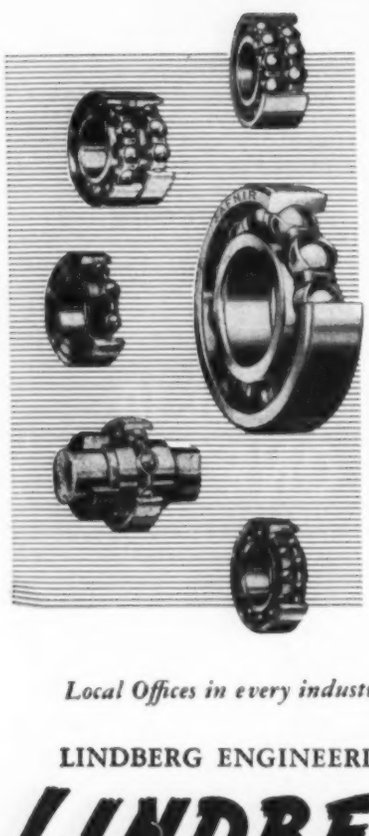




FAFNIR USES 20 LINDBERG CYCLONES

. . . to draw thousands of types of bearings!

The Fafnir Bearing Company, New Britain, Conn., uses Lindberg Cyclone Furnaces to draw thousands of types and sizes of its line of ball bearings. They say:

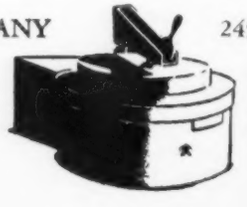
"The metallurgical department of our company entrusts the major part of its drawing operations to Lindberg Cyclone Furnaces because it has found them to be dependable work horses. At the present time there are 20 in use in the Company's three ball bearing plants in New Britain, Conn.

"They have given excellent continuous service for more than 8 years. For long periods they were operated 24 hours a day, seven days a week, (at temperatures ranging from 275 to 1200°F.) without downtime due to furnace failure.

"Because the Fafnir line of ball bearings,comprising thousands of types and sizes, is considered the most complete manufactured in this country, the Lindberg Cyclones draw a considerable variety of parts. The work varies from small to large dense loads (up to 1600 lbs.) of bearing rings, balls and rolls, yet the uniform results demanded for the manufacture of precision products is constantly being achieved—and in an atmosphere of cleanliness and satisfactory working conditions."

Local Offices in every industrial center.

LINDBERG ENGINEERING COMPANY 2452 W. Hubbard Street, Chicago 12, Illinois.

LINDBERG  **FURNACES**

Fatigue Cracks

by Charles T. Post

Profit

They used to say, "You can't go broke making a profit."

That, of course, was before present tax schedules.

Success Story

We see by the papers that a baby was born in Macy's basement last week. The child, it appears, is in an excellent position to start at the bottom and work up.

O.K. Boss

Editor Tom Campbell tried in vain to comfort his fellow commuter riding home on the train the other night. The man had had a tough day. Phone rang constantly from the minute he walked in the office. Complaints. Rejects. Stupid questions. Enough to ruin anybody's disposition.

Finally, about 4 o'clock the phone jangled again, just as he was in the middle of some government forms.

"Jones," said a stentorian voice, "effective January first your salary is raised $1000 a year!"

That was the last straw. With all this, jokers calling.

"You can go plumb to hell," roared Jones, and slammed the receiver.

The phone rang again, almost instantly. Same voice.

"Jones," said the voice reprovingly, "this is the president of your company. Did you hear what I first said to you?"

It was the president of the company.

This really happened. There wasn't much Campbell could do to comfort the man.

Mink and Taxes

When the new income tax blanks arrived in the mail the other day, John's wife intercepted them. She corralled him when he got home.

"John," she purred, sheathing her claws, "I'm tired of having you pay for mink coats for other women. How about one for me this time?"

You can understand, now, why this business down in Washington has got to stop.

Geneva

Walther Mathesius, who recently retired as president of Geneva Steel Co., Geneva, Utah, has moved back to the Middle West and settled in Geneva—Geneva, Illinois.

Commies

In its November 19 issue, *Electrical World* headed an article on the Missouri River, "Missouri Basin Power Must Triple in 20 years, USSR Survey Shows." After establishing a beach head in the State Department, have the Commies moved in on the U. S. Bureau of Reclamation — the U. S. B. R.—too?

No Smell

It is worthy of note that the U. S. Dept. of Commerce's annual list of special days and weeks during 1952 shows that the week of Jan. 6, to 12 is designated "Odorless Decoration Week."

Puzzlers

Although C. S. Kinnison, Hoskins Mfg. Co., didn't give us the answer to his puzzle which was in last week's issue we think we have figured it out. The diameter should be 9 in.

So far the only correct answer to the number problem has come from J. C. Severn, Toledo Pressed Steel Co. Several others were confused by the wording of the problem and thus started off on the wrong track.

L. D. Rice has just worked his way through the encyclopedia puzzler, apparently a page at a time.

F. P. Boulais, Campbell Soup Co., poses this one. If Bob gave Abe a mule Abe would have twice as many mules as Bob; or, if instead of that, Abe gave Bob a mule they would both have the same number of mules. How many did each have to begin with?

On any metal finishing problem

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Calcium buffing compound was formerly removed from the fluted surfaces of these tweezers by costly hand brushing and follow up cleaning rinse. After the switch to Du-Lite's safety soak solvent, Dynakleen, the compound was removed in seconds and the tweezers quick-dried to a sparkling finish, with no other operations necessary.

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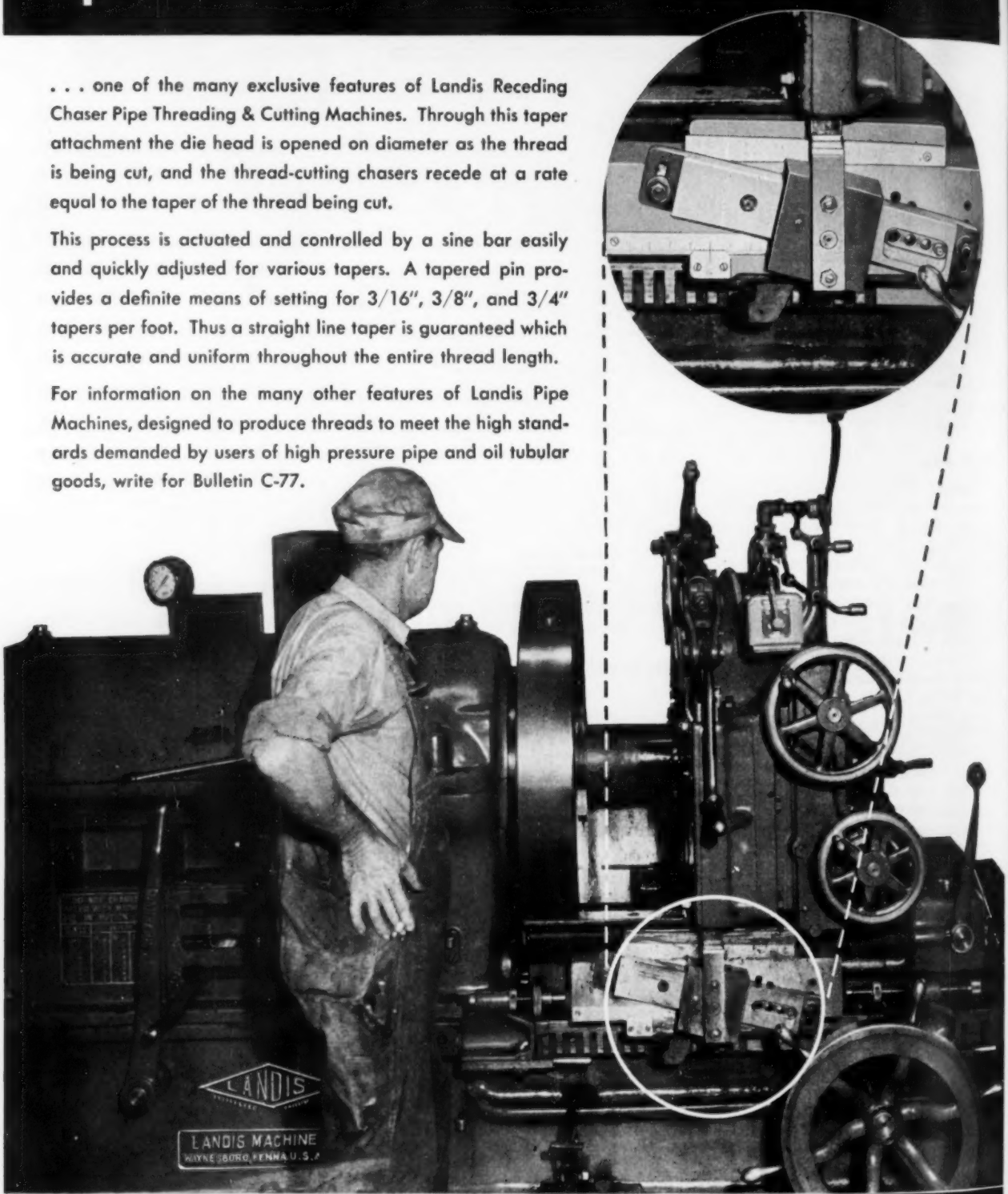
For information on the many other features of Landis Pipe Machines, designed to produce threads to meet the high standards demanded by users of high pressure pipe and oil tubular goods, write for Bulletin C-77.



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the Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► A large steel company is considering replacement of some open-hearth capacity with 150-ton electric furnaces. At the moment the project is merely being investigated, but if it goes through, it will mean furnaces about half again as large as anything now used.

► Thousands of steel users have just one idea in mind today: Cash all the CMP tickets in sight and look around for more when they are gone. Reason: There may be a steel strike; but strike or not, steel prices are bound to go up next year.

► Growing acceptance of rail steel quality reinforcing bars coupled with the bar shortage is resulting in increased mill production of reinforcing bars of off-heat hard grade steel. These tonnages are a boon to consumers because they don't require CMP tickets. One major mill has scheduled a considerable tonnage of these bars for February-March rolling.

► Many in Washington expect the steel wage-price case to reach a government-appointed labor panel shortly after the first of the year. One of the country's leading labor lawyers who has sat on such boards before has already been approached. Top level decisions have not yet been made but the stage is being set.

► With encouragement if not actual blessing from Washington, some unions have found ways to go through the wage ceiling without breaking it. Straight cents per hr increases have been held within the ceiling while fringes and differentials have gone through the roof.

► A firm in the Russian occupied zone of Europe, fabricating products of a strategic metal for delivery to western users, has found an ingenious way to keep that metal from being seized by the Reds. Western customers furnish their own metal but the company accepts only enough at one time to meet one week's production needs —never enough therefore to make it worth seizing by the Russians.

► Manufacturers on defense contracts are being plagued by starts and stops and design changes because: (1) The military hesitates to freeze designs; and (2) some DPA and NPA organizational setups have not been too efficient. It may wind up with Defense Mobilizer Wilson making up the military mind and freezing designs so as to get some volume production.

► Shipbuilding companies in the Great Lakes area are to get the same priorities as machine tool builders to overcome serious delays in deliveries of Lake ore vessels. Currently 1200 workers are needed in yards for repair work and for new vessel construction.

► A 60-ton lot of a new refractory for use in openhearth superstructure construction and maintenance is now being readied for service testing. If outcome is as good as laboratory tests indicate it should apply more effectively and stand up longer.

► Within a few days of the pouring of the 100 millionth ton of steel in the U. S., the 100 millionth motor car rolled out of a U. S. assembly plant. And as many drivers might have guessed, the total of cars in operation in the U. S. has passed the 50 million mark.

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5 Cam Master Switches
6 Safer Electrical Interlocks ✓
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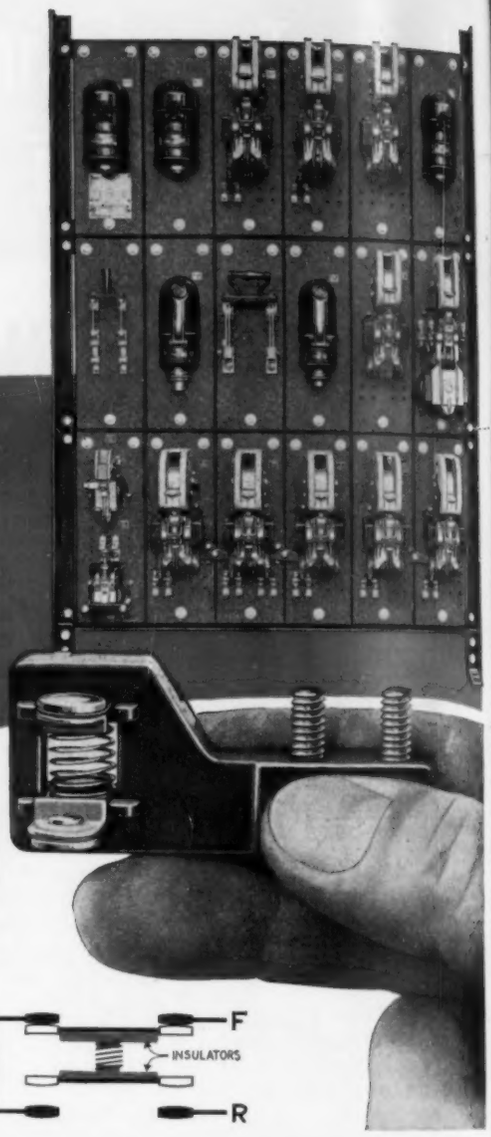

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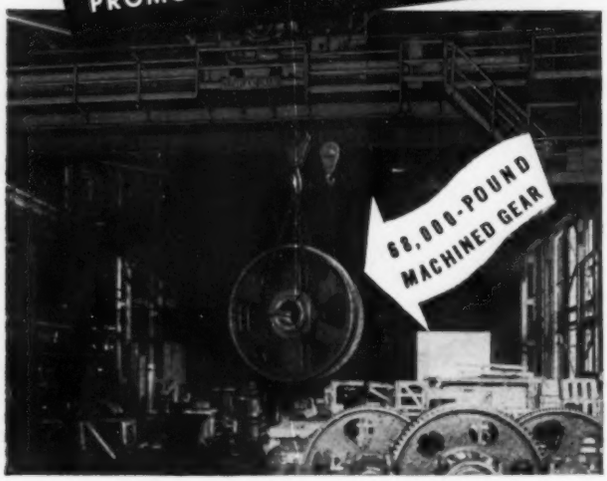

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SLAG: Plan to Increase Scrap Steel Yield

NPA eyes flat scrap stockpiles and pushes scrap recovery from slag dumps . . . Expect recovery to hit 1 million tons per year mark . . . Heckett biggest operator—*By J. B. Delaney.*

Like the meat packers who use everything but the pig's squeal, steel producers are not missing any bets on the recovery of everything useable from a melt of steel —including scrap.

Near the top on the conservation agenda is recovery of steel from openhearth slag. With one eye on the flat silhouette of steel scrap piles, the National Production Authority is taking a fatherly interest in the project.

Best estimate is that within a relatively short time approximately 90,000 tons of scrap will be recovered each month from slag. That's at an annual rate of 1,080,000 tons. NPA would like to see this increased considerably, and is pressing for installation of additional recovery plants throughout the country.

Dutch Process—This also happened during the last war when the War Production Board encouraged re-working of old slag dumps to generate additional scrap for mill furnaces.

Biggest operator in the business is Heckett Engineering, Inc., of Butler, Pa., headed by E. H. Heckett, who brought the process to this country from Holland in 1939 and started up his first recovery plant that same year at the South Chicago works of Republic Steel Corp.

Heckett had operated approximately 20 plants in Europe for the recovery of steel lost with openhearth slags and refuse. The Republic installation was the first step taken in this country for complete recovery of the lost steel by preparing and cleaning to the point where the material could be used practically without limitation in the openhearth.

When it completes installations already contracted for, Heckett operations will be recovering 70,000 tons per month.

Originally, Heckett operations were limited to processing of the slag with movable separators and stationary cleaning installations. Recent contracts have expanded Heckett activities to complete slag handling and recovery, in some instances taking on jobs normally done by the mill's skull cracker.

New Method—In conjunction with the mills, Heckett has developed a new method of dumping slag thimbles and has practically eliminated the problem of stickers, avoiding unnecessary wear and tear on thimbles. The operation at Youngstown Sheet & Tube's Indiana Harbor plant is of this type.

Second Heckett contract was at Gadsden, Ala. After the war, the company added plants at Republic in Warren; Tennessee Coal, Iron & Railroad at Fairfield; Steel Co. of Canada, Hamilton; Dominion Steel and Iron, Sydney, N. S.; Newport Steel Corp., and, under an affiliated company, at Alan Wood, John A. Roebling's Sons Co., and Central Iron and Steel.

Recent installations include Inland Steel at Indiana Harbor, and Geneva Steel, Provo, Utah. A contract has been closed at the new Fairless Works, under which the company will handle all the jobs normally done by the mill's own slag yard and skull cracker.

METAL-FROM-SLAG: A typical modern operation for recovery of metal from openhearth slag. Crane is dumping slag thimbles. Later, separator in background will go to work to recover usable metal for recharging into furnaces.

Further expansion on a large scale is contemplated, and a number of important contracts are under negotiation. This is being done in close cooperation with NPA to alleviate the scrap shortage.

Arrival of inclement weather over a large part of the country lends more urgency to this program of scrap recovery. Many mills are within a few days of curtailments due to low scrap inventories. If the weather holds up scrap movement, this threat may materialize.

Crucible Steel Co. at Midland, Pa., plans to delay starting up an openhearth now under repair if scrap supply doesn't improve.

MINERALS: Hunt Knows No Boundaries

DMPA seeks to increase domestic, foreign output . . . Offers guaranteed price, market . . . U. S. forever tied to imports . . . DMPA welds together farflung responsibility—*By T. Metaxas.*

The heartbeat of mining for minerals and metals is stronger and faster. Tonic for expanding production both in the United States and in the free world overseas is being provided in increasing doses by Washington's Defense Minerals Procurement Agency. It was born last September with a 1-track mind on gathering from all over the earth enough copper, lead, zinc, bauxite, chrome, manganese to support America's war-stimulated productive plant.

Last week DMPA walked another step deeper into controversial subsidies—supported by one of the laws in its constitution that it must "make any payments necessary to ensure essential production of minerals and metals for defense." DMPA said it must exceed the ceiling price of copper (24½¢ per lb) so that some domestic copper output should not be lost. The subsidy would be in the form of a premium above the ceiling to marginal producers. Other producers decry support of these marginal facilities as injurious to overall production.

Long Dependence—Realistically accepting the certainty that expanding American industry is eternally bound to foreign sources of supply, DMPA is offering attractive terms to overseas countries to produce more minerals for America. Pattern for broader exploitation of resources both here and abroad is guaranteeing a market for new production at a safe floor price. Other inspirational devices are loans, firm commitments, and providing equipment.

DMPA arose out of a garbled, shambles-like minerals structure. Short-sighted U. S. policy had neglected to develop both domestic and foreign mines. The old practice was to search the world for minerals when crisis production demanded but to relax complacently and let the mines go to ruin when the immediate need tapered off.

Unfavorable taxation and tariff policies had scared away investors in mining by the droves and consequently America had no reserve capacity on which to rely for a quick buildup. DMPA will try to make up for past sins. The most important effect of its formation was wresting away the multiple lines of minerals responsibility from the hands of over 30 different agencies. Indecision and impotency of federal minerals administration resulted from a complicated disunity.

An Entity—Now DMPA has centralized the farflung responsibilities. For the duration of the emergency, at least, concrete procurement plans will be in effect. DMPA has set definite goals stretching over varying periods of time. Each has an end in sight—easing sufficiently or wiping out shortages of minerals and metals.

Howard I. Young, deputy administrator of DMPA under Jess Larson and president of American Zinc, Lead & Smelting, told THE IRON AGE that shortages would be solved gradually but that the next 6 months would cause serious inconvenience to civilian producers.

"Ready, Joe—Here comes one."

DMPA feels that aluminum shortages will vanish in 2 years. It plans an increase of from 225,000 to 250,000 tons of copper in 3 years—most of it to come from domestic mines. Lead may be in comfortable supply in 3 years. Manganese is in dangerous supply but much overseas contract work remains to be done. Domestic collection stations at Butte, Mont., and Deming, N. M., have already exceeded their quotas and sights have been happily raised.

Overseas Emphasis—Tungsten will constantly be a critical material but defense-adequate supply should be attained under a 5-year DMPA program. South Korean mines have been activated for limited production under American management. Chrome ore is under a 5-year program and although nickel supplies are excruciatingly tight, January production of the World War II standby plant at Nicaro, Cuba, will do much to help supply.

Increasingly heavy emphasis will be put on foreign contracts and development. Having been deeded Economic Cooperation Administration's Minerals Div., DMPA will get mineral imports in return for funds and equipment. Importance of minerals and metals imports to American industry must not be minimized. A clue to their extent is stockpile spending of $4.5 billion to date. Of that, $3.5 billion has been or will be spent for imported materials.

DMPA minerals contracts agree to pay either a ceiling or a premium-plus-ceiling price for production of new facilities. DMPA also guarantees to purchase a substantial part of new production. Agreements are tailor made to need. In some cases DMPA per-

mits a producer the option of selling part of his output on the U. S. market. If the minimum price agreed upon cannot be met, DMPA will buy up the material to either stockpile or resell at going prices.

Aid from Experts—The agency is wisely calling on American mining men to lend it assistance. This "consultant" force of experts keeps size of DMPA's staff to inexpensive skeleton size. Besides, that kind of experience is found in the field and cannot be hired.

DMPA must constantly ward off calamity howls of shortage. It cannot let itself be forced headlong into uneconomical developments. Since average time of starting a new mining property to first phases of production usually takes an average 2 years, DMPA must patiently explain that fuller supplies of minerals cannot be turned on and off like a water tap. It takes years of building.

Minerals men hope that the spirit of DMPA will continue after the crisis. They fear a return to the scheme of multiple responsibility for minerals. What is needed, they say, is a centralized agency with the power to push reforms through congress and influence the making of international policy to include agreements yielding new imports.

American industry has grown to such a point that it is sink or swim on minerals. Fortunately signs point to a government awakening on the problem.

Mining Unearths 70 Tons of Scrap

After 25 years of processing scrap at Israel Bros. Co. scrap yard, Dayton, the company started mining it, recovering over 70 tons of usable scrap.

Many years ago a 5000-lb "drop ball" was used to break up castings. Heavy cast bases used as anvils were driven into the ground with pieces of scrap.

Israel Bros. recalled these operations and began mining. A crane and power shovel unearthed a 12-ton and a 5-ton cast base.

FOUNDRIES: Looking for New Jobs

Many taking off deer season and Christmas week . . . Shipments of coke drop 25 pct since Sept. 1 . . . Merchant iron market may soften . . . Cast scrap demand down—*By R. L. Hatschek.*

The iron casting industry has yet to feel the effects of the rearmament boom. And because of rearmament, cutbacks in production of civilian items have fostered a lack of work for foundrymen. Smaller jobbing foundries are particularly hard hit while the larger outfits seem to be fairly well stocked with unfilled orders. The condition seems to exist generally throughout the country.

A higher than normal percentage of the small iron casting shops are giving their personnel 3 days off for the deer hunting season. Many of the foundries are also taking off the entire Christmas week. This is not too uncommon a practice for the purpose of taking year-end inventories but trade sources say they have not seen this many take the week for some time.

One excellent barometer of activity in the iron founding industry is found in coke shipments and one coke supplier in eastern Pennsylvania reports that his shipments to foundries have fallen approximately 25 pct since Sept. 1. Foundry stockpiles of coke are also reported to be at a high level.

CUTOFF: Risers are removed rapidly from cast steel spur gear blanks by a gas torch. An Oxweld cutting blowpipe cuts off the 14-in. wide risers at the rate of 5½ in. per min. Operator is shown regulating nozzle clearance at the start of a cut.

Iron Easing—Pig iron producers still cannot call the market soft but it is certainly not so tight as it was a year ago and don't forget the continued softness in demand for foundry grades of scrap iron in an extremely tight scrap market. The market for cast scrap usually builds up to a much quicker pace in the winter months. It hasn't this year.

One complaint frequently heard in the foundry business is that rearmament work has not yet sifted down to the smaller outfits in quantities sufficient to maintain full operations. Only a few, such as hand grenade orders and bullet making machine orders, have reached the jobbing foundries.

Many foundrymen have lost faith in industrial policies of the Administration. They wonder at rosy reports issuing from Washington on the sound state of American industry. Why aren't they sharing in the mythical boom, foundrymen ask?

South Charleston Plant Reopens

U. S. Steel Co. will resume partial operation of the Naval Ordnance Plant at South Charleston, W. Va., inactive since the end of World War II. About 100 men will be employed at the start, principally in the heat treating of armor plate.

Initial operations will include four heat-treating furnaces, one 6000-ton electric hydraulic press, and flame-cutting equipment. Plates will be shipped from U. S. Steel Co.'s Homestead, Pa., plant.

During the war the plant was used in heat-treating, forging, and machining Navy armor plate.

SHIPPING: A Boom With Worries

Abnormal conditions, government subsidies needed to keep U. S. shipping healthy . . . High costs kill competition . . . Is it worth it? . . . Busy shipyards worry too—*By G. G. Carr.*

American shipping men are enjoying the biggest boom in history—and sometimes act as if they were being followed.

Reason for this nervousness in the midst of plenty is the ambiguous position of shipping in the U.S. economy. Called "vital" and "essential" by defense officials, it can exist in normal times only through whopping government subsidies. The postwar boom and an artificial worldwide shortage of bottoms has temporarily contradicted this, but it remains true for the long run.

ON THE WAYS: American Export Line's *Constitution* being built in U. S. yard.

High Costs—Operating costs of foreign flag ships are so much lower than those for American ships that under normal conditions free market competition is impossible. Today, with freight rates four or five times pre-World War II schedules, U. S. lines can return most if not all of their subsidies to the Maritime Administration and still show a profit. But U. S. costs are still prohibitively higher than those of other countries—two and a half times more than Greece, for example.

Labor is by far the biggest reason for the higher costs. Straight wages, while the highest in the world, are not the only part of it. Our seamen live better, eat better, and receive more welfare benefits than in any other merchant marine. It all adds up to a staggering bill, besides which even such traditional cost factors as fuel consumption and dry dock charges become insignificant.

Is It Needed?—Some highly vocal groups insist that America must have a strong merchant marine at all costs. Defense and international prestige are the main reasons usually advanced. But ship operators admit privately that, defense aside, the merchant marine is a very expensive luxury. Even in the boom years of 1938-48 ship operators needed $35,515,000 in U. S. subsidies to stay in the black.

They argue further that ocean haulage is a fine way for foreign countries to earn badly needed dollars. At present, they frequently have to spend them on American freight rates. ECA has had to put ceilings on carrying charges for Marshall Plan goods.

Defense is the most solid argument advanced by merchant service proponents, and the most popular. Obviously, shipping needs soar in wartime, and many experts believe a big ship reserve to be as essential as ammunition for security. Some officials, including President Truman, however, feel that we would be getting more for our defense dollar by helping friendly foreign powers to build up their merchant fleets. These could be pooled in time of war.

Yards Busy—Regardless of arguments, shipyards right now are busy places. Suspension of work on 14 new "Mariner" class freighters because of lack of steel was a blow, but U. S. still ranks fourth in world ship production. If plans for government subsidization of steel conversion go through, the present construction figure of 1,082,990 tons may go higher.

Shipyard operators share the worries of ship owners. Practically all their orders now are from the Maritime Administration. The few orders from private owners carry a subsidy from the agency: cost difference between U. S. and foreign yards up to 50 pct of the total cost of the ship.

Some Hopes—The picture isn't quite so black for shipbuilders as for operators. Government regulations require that all domestic lake and river traffic, and ocean traffic between U. S. ports travel in American-built bottoms under American registry.

Defense Dept. orders should remain juicy for some time to come. And there is always the hope that high production and abundance of raw materials can overcome the cheaper foreign labor differential.

Chilean Ore for U. S.

CHILEAN iron ore is helping to feed this country's busy blast furnaces. Last year Chile shipped 85 pct of its total production here—2,550,000 tons from the El Tofo mine alone. That's enough to fill the ore requirements for 2,500,000 tons of steel.

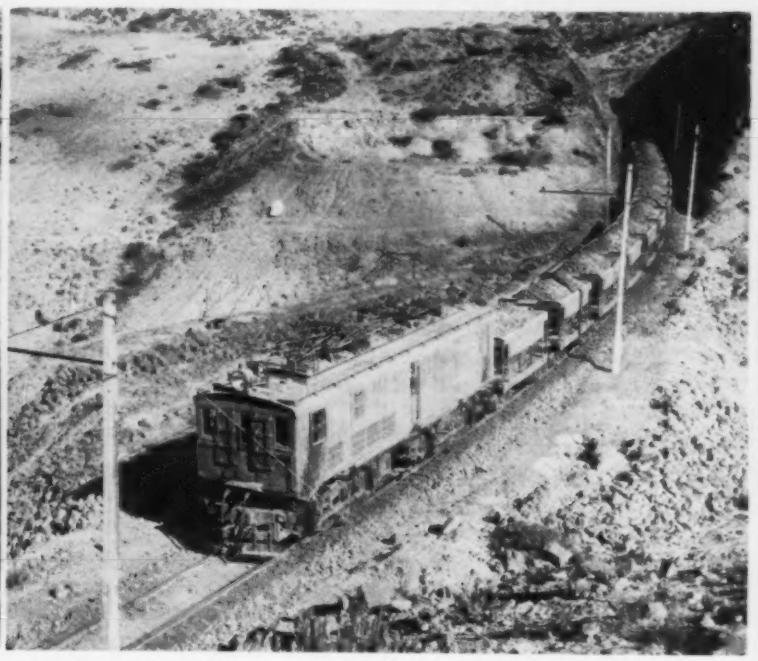
Under the pressure of increased demand from both the U. S. and South American countries, blasting goes on day and night in the ore pits. Modern equipment processes the ore in the crushing plant at the mine site before shipment. Ore workers don't have much of a commuting problem. They live in homes on the terraced sides of El Tofo mountain.

Ore from El Tofo, which runs 58 pct Fe, is shipped by rail from the mine to Cruz Grande. From there it is shipped by water to Baltimore or to Chile's own steel plant at Huachipato.

Chile's newest industry, the steel plant, Companio de Acero del Pacifico, was opened a year ago as a project of the government's Corporacion de Fomento (Company for Industrial Development). Present annual capacity is 180,000 tons. This is now being expanded to 280,000 tons with the help of a recent $10 million loan.

FOR U. S.: Blasting goes on day and night at El Tofo to loosen the iron ore. Most of it is destined for the U. S. blast furnaces.

ROUTE: Conveyers move ore to the crushing plant to prepare it shipment to Cruz Grande and the waiting oceangoing ore ships.



HAULS ORE: Electric locomotives haul the crushed ore from El Tofo to Cruz Grande for shipment to the U. S. or Chile's new steel plant at Huachipato, second largest integrated mill in South America.

HIGH LIVING: Workers' houses are terraced into the mountainside at El Tofo. More steel production will do much to raise Chile's standard of living and will be a major step in achieving economic self-sufficiency.

NEW BUSINESS: Huachipato steel mill is Chile's newest industry. Completed last year, it has an annual capacity of 180,000 tons which is now being increased to 280,000.

TOOLS: Open Reserves at Ford Plant

USAF offers stored machine tools . . . Over 300 contractors' reps from 44 states look over 1000 machines left of 10,500 . . . Ford and others were there first—*By E. C. Beaudet.*

When aircraft plants began shutting down in 1945 Air Force officials remembering machine tool bottlenecks during the war rounded up the most vital equipment for storage in case of a future emergency. Reserve pools were set up in the former Bell aircraft plant in Marietta, Ga., and the Martin bomber plant in Omaha.

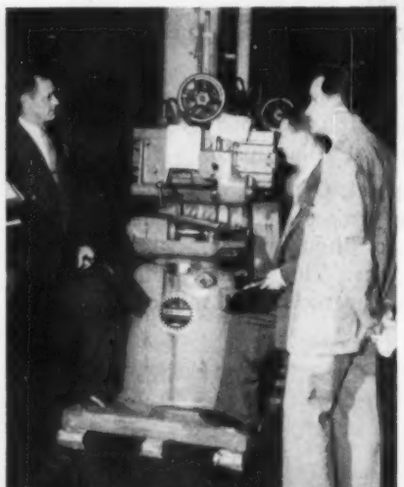
Although not basically a storage depot, a considerable amount of machine tools and related industrial equipment was left in the former Dodge plant in Chicago, now the Ford Aircraft Engine Div. of Ford Motor Co.

Lease or Rent — Last week the Air Force offered the equipment at Ford for lease or rental to prime and subcontractors on a mass screening basis. Over 300 Air Force contractors' representatives from 44 states visited the plant in search for badly needed machine tools and equipment.

The pickings were lean. Of the 10,500 pieces of machinery left at the end of the war, a little over 1000 remained. Ford had already taken about 8500 for its own production, and previous individual screenings by other contractors accounted for the rest.

Among the items available were lathes, automatic screw machines, milling machines and grinders. Much of the equipment consisted of heat treating equipment, dust collectors and magnetic testing inspection machines and others of a specialized nature not readily adaptable to other uses.

Everything Helps—The visitors didn't expect to find a bonanza. Most of them were veterans of previous junkets to Marietta and Omaha where the larger reserves were kept. But as one visitor put it, "If you're able to pick up even one needed machine tool these days you're doing pretty well."



BROWSING: Representatives of U. S. Air Force contractors look over machine tools in the USAF reserve pool at Ford Aircraft Engine Div. plant.

When the reserve pools were set up it was thought they would be dormant for 15 to 20 years. Now a little over 6 years later Air Force officials report that over 90 pct of their reserve pool has gone to defense production.

The pool at Marietta which once held 19,000 machine tools is now down to around 2500. At Omaha the original reserve of 10,000 stands at a little over 1000. Much of this machinery is unusable without extensive rebuilding and reconversion.

Eases Procurement — While many contractors were unable to fill their needs from the reserve pools, they have alleviated some of the bottlenecks in machine tool procurement. At the Ford aircraft plant easy accessibility to used machine tools enabled them to speed up Ford's procurement on some items by 18 to 24 months.

The Bridgeport Lycoming Div. of Avco Mfg. Co. has been able to fill 90 to 95 pct of the major equipment requirements needed to produce Wright 1820 radial and GE J 47 engines from reserve pools.

One giant upsetting machine, requiring 17 flat cars to ship it from Marietta to New Process Gear in Syracuse, N. Y., would have taken 3 to 4 years to get in the present market. Other satisfied representatives reported similar results.

Successful Traveler — A master mechanic from Perfect Circle Gear Corp., Hagerstown, Ind., who has traveled 8000 miles in the last 2 months, was able to pick up 31 machine tools at Marietta, 12 out of Omaha and about five at Ford.

Since the tools from the different reserves were given out on a priority basis, many found fault with the program. The biggest gripe came from those who claimed the reserve pools were so well picked over by other contractors at previous screenings that there was little of value left.

They wanted to know who got first crack at it. Others expressed dissatisfaction with other branches of the military for not opening up their reserves more to defense.

Process Clads Copper to Steel

A new process for cladding copper to steel was shown last week in Cleveland. The demonstration in the Jas. H. Herron laboratories was of the process developed by W. L. Ulmer of Automatic Gasflux Co., and Superior Flux & Mfg. Co., Cleveland.

In the new process, molten copper is poured onto steel slabs on the sides of which walls are welded to retain the molten copper. The steel surface, already treated with vapor flux, is again treated with flux as the copper flows over it. After solidification of the copper and a re-heat, the combination is then rolled. Any copper thickness from 10 pct up can be produced by the technique.

Tests, including stamping and drawing, are said to indicate that the bond produced is inseparable for all practical purposes.

STEEL: "No Contract, No Work"

Wage Policy Committee declares intent to strike . . . Speed becomes vital if strike is to be averted . . . Washington enters contract negotiations to save valuable time—*By J. B. Delaney.*

This is the week Washington steps into the steel labor contract negotiations. This is the only apparent way a nationwide strike can be averted—or postponed.

On Monday, the CIO United Steel Workers of America's 170-man Wage Policy Committee met in Pittsburgh and declared its intent to strike if a contract settlement could not be reached. It was a meaningful reiteration of the union's "no contract, no work" policy. (See p. 129.)

Chances of strike after Dec. 31, expiration date of the present contract, are now much greater and Philip Murray, union chief, saw little chance of the steel industry and the union getting together for some quick labor harmony. Union leaders indicated that the industry had offered absolutely nothing.

Meeting — The committee directed Mr. Murray to call a special International Union meeting for Jan. 3—probably to be held in Atlantic City. Thus the union may be on strike for 3 days when the cross-country group meets. It is possible that some government appeal to return to work may be sent to the meeting. In that case a vote is in order and the 2500 members expected to attend may well vote "back to work."

Two conciliators made a hurried trip to Pittsburgh last week to confer with both sides on the apparent crisis—then left.

Bad Feeling — Unless an unforeseen "miracle" occurs meanwhile this would be the only way to keep the mills operating. The problems raised by the USWA's 22-point demands on the industry are too knotty to be worked out overnight. Too many important principles are involved. The guaranteed wage and the union shop are examples.

Mr. Murray's summoning of the Wage Policy Committee to Pittsburgh made official what was apparent almost from the start of negotiations with U. S. Steel Corp. The conferences not only were fruitless, but "leaks" from the meeting indicated considerable bitterness was being generated.

Tread Lightly — There is no question that if the union president gives the word the mills will go down. Washington knows the situation is a delicate one. The Administration is friendly to labor and probably will lean more than a little toward the union point of view. At the same time it must tread softly. Statements by steel executives before and since negotiations started indicate that the industry's larger producers, at least, are in no mood to be kicked around.

Industry leaders have made it clear that if they are forced to grant a wage increase they must have a price increase. Some feel they need a price boost anyway.

Get Modified Union Shop

In the Dec. 13 issue (p. 91) it was reported that Pittsburgh-Des Moines Steel Co. had granted a union shop to the CIO United Steelworkers. Actually the concession was a modified form of the union shop. Employees have 30 days from Dec. 4 to withdraw from the union, and 30 days from Oct. 2, 1952, to relinquish their membership. A new employee must join the union and retain his membership until Oct. 2, 1952.

STEEL: Finished Shipments Rise in October

As Reported to the American Iron & Steel Institute

STEEL PRODUCTS	CURRENT MONTH Carbon	Alloy	Stainless	Total	Pct of Total Shipments	TO DATE THIS YEAR Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingots	96,741	20,810	2,087	119,638	1.7	*862,596	199,602	16,039	*1,078,237	1.6
Blooms, slabs, billets, tube rounds, sheet bars	140,278	53,538	1,659	195,475	2.9	1,400,370	478,769	15,324	1,894,463	2.9
Skelp	16,284	.....	.....	16,284	0.2	125,983	.....	.....	125,983	0.2
Wire rods	75,857	1,466	417	77,740	1.1	694,539	13,690	3,979	712,208	1.1
Structurals	435,731	6,026	10	441,767	6.5	4,036,654	55,594	68	4,092,316	6.2
Steel piling	31,863	.....	.....	31,863	0.5	*338,365	.....	.....	*338,365	0.5
Plates	648,586	33,641	1,577	683,804	10.0	6,189,087	332,585	14,495	6,536,167	9.9
Rails—standard	155,936	13	.....	155,949	2.3	1,434,529	169	.....	1,434,698	2.2
Rails—all other	9,053	4	.....	9,057	0.1	103,254	56	.....	103,310	0.2
Joint bars	11,212	.....	.....	11,212	0.2	111,325	.....	.....	111,325	0.2
Tie plates	39,130	.....	.....	39,130	0.6	376,620	.....	.....	376,620	0.6
Track spikes	12,875	.....	.....	12,875	0.2	137,154	.....	.....	137,154	0.2
Wheels	35,795	15	.....	35,810	0.5	332,511	155	.....	332,666	0.5
Axles	20,499	56	.....	20,555	0.3	187,703	560	.....	188,263	0.3
Bars—hot rolled	585,773	194,306	4,529	784,608	11.5	5,459,787	1,895,110	35,706	7,390,583	11.2
Bars—reinforcing	169,672	.....	.....	169,672	2.5	1,583,193	.....	.....	1,583,193	2.4
Bars—cold finished	142,509	31,480	3,753	177,742	2.6	1,292,674	281,987	34,494	1,609,155	2.4
Tool steel	2,468	11,815	.....	14,283	0.2	28,160	115,734	.....	143,894	0.2
Standard pipe	256,284	84	30	256,398	3.7	2,443,233	1,330	62	2,444,625	3.7
Oil country goods	139,775	15,588	.....	155,363	2.3	1,387,872	165,339	.....	1,553,211	2.4
Line pipe	268,038	12	.....	268,050	3.9	*2,668,619	791	.....	*2,669,410	4.1
Mech. tubing	64,032	28,919	507	93,458	1.4	564,920	248,806	5,210	818,936	1.2
Pressure tubing	32,449	2,894	808	36,151	0.5	236,576	19,855	8,404	264,835	0.4
Wire—drawn	273,770	4,201	3,113	281,084	4.1	2,636,490	43,362	26,464	2,706,316	4.1
Wire—nails, staples	78,069	.....	2	78,071	1.1	723,522	.....	29	723,551	1.1
Wire—barbed, twisted	21,936	.....	.....	21,936	0.3	190,185	.....	1	190,186	0.3
Wire—woven fence	34,916	.....	.....	34,916	0.5	352,966	.....	.....	352,966	0.5
Wire—bale ties	10,797	.....	.....	10,797	0.2	91,871	.....	.....	91,871	0.1
Black plate	116,235	.....	.....	116,235	1.7	856,377	.....	.....	856,377	1.3
Tin & terne plate—hot dipped	141,906	.....	.....	141,906	2.1	1,412,051	.....	.....	1,412,051	2.1
Tin plate—electrolytic	252,378	.....	.....	252,378	3.7	2,398,221	.....	.....	2,398,221	3.6
Sheets—hot rolled	661,879	23,677	2,491	688,047	10.1	6,635,929	255,303	32,329	6,923,561	10.5
Sheets—cold rolled	754,139	10,752	9,458	774,349	11.3	7,892,094	99,032	83,494	8,074,620	12.2
Sheets—galvanized	160,552	.....	.....	160,552	2.3	1,695,939	907	.....	1,696,846	2.6
Sheets—other coated	20,552	.....	.....	20,552	0.3	217,958	.....	.....	217,958	0.3
Sheets—enameling	8,241	.....	.....	8,241	0.1	152,837	.....	.....	152,837	0.2
Electrical sheets, strip	11,819	52,759	.....	64,578	0.9	119,054	525,035	.....	644,089	1.0
Strip—hot rolled	195,645	2,813	839	199,297	2.9	1,802,979	32,952	6,701	1,842,632	2.8
Strip—cold rolled	166,280	1,931	16,059	184,270	2.7	1,569,954	23,979	163,308	1,757,241	2.7
TOTAL	6,299,954	496,800	47,339	6,844,093	100.0	*60,744,131	4,790,702	446,107	*65,980,940	100.0

During 1950 the companies included above represent 99.0% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

STEEL: Structurals Quotas Set

Nearly 85 pct given to five major programs . . . Steel gets largest share for expansion . . . Aircraft and ordnance allocated 83,756 tons . . . Commercial building gets only 10,030.

Nearly 85 pct of the structural steel set aside for industrial expansion during the first quarter was allocated last week for five major programs — steel production; aircraft, aircraft accessories, and ordnance; aluminum, magnesium and light metals; machine tools and industrial equipment; and chemicals.

These five programs are to get 313,651 tons of the total of 370,315 tons allocated. Stated requirements for all programs totaled more than 610,000 tons.

Most for Steel—Allocations for steel expansion amounted to 138,632 tons (72.6 pct of requests). This was the final figure after the steel industry had voluntarily squeezed from its requests some 35,000 tons for temporary deferral.

The machine tool and industrial equipment program got better than 62 pct which worked out at a total allotment of 32,784 tons.

Chemical industries got only 32,874 tons, about 46.5 pct of stated needs.

100 Pct—The aircraft, aircraft accessories, and ordnance programs got nearly 100 pct of needs or 83,756 tons. So did the aluminum and light metals programs which came in for 25,656 tons.

Building materials generally got one-third of the requested structural steel, the relatively small amount of 4205 tons. But no tonnage whatever was allowed for expansion of lumber and lumber products, as no shortages are expected there.

Little Left—A small amount requested by railroad equipment manufacture expansion was also passed over. Present capacity is seen as adequate for production of as much equipment as supplies of other materials will allow.

Structural Scoreboard

First Quarter, 1952, net tons

Program	Stated Needs	Allotment	Pct of Request Allotted
Aircraft, ordnance	88,701	83,756	94.5
Aluminum, magnesium, light metals	26,000	25,656	98.6
Building	11,539	4,205	36.4
Chemicals	70,291	32,733	46.5
Consumer durables	10,540	1,395	13.2
Containers	11,427	411	3.5
Copper, brass	2,029	1,761	86.8
Electrical	3,213	1,116	34.7
Electronics	4,722	4,620	97.8
Machine tools	52,514	32,874	62.6
Iron, steel, ferro-alloys, foundries, refractories	191,454	138,632	72.4
Leather	204	0	0
Lumber	1,156	0	0
Misc. metals, minerals	7,000	6,191	88.4
Pulp, paper	31,280	10,046	32.1
Railroad	569	0	0
Rubber	8,163	5,770	70.7
Scientific, technical equip.	7,220	2,099	29.0
Textiles, synthetics	19,227	8,781	45.6
Tin, lead, zinc	419	70	16.7
Printing, publishing	777	169	21.7
General commercial	61,995	10,030	16.1
Total	610,440	370,315	

General commercial construction—and this includes religious, entertainment, and community construction—also had to stand aside. NPA's Facilities & Construction Bureau got only 16 pct of its request—some 10,030 tons—to be divided up among all claimants.

Machine Tool Top Priority

New top-priority rating (Z-2) set up for the machine tool industry last week by National Production Authority will to some extent start moving long-awaited controlled materials, as well as component parts, toward tool makers.

Effect of this move is to place tool manufacturers in the same priority category with producers of tanks, planes, and other military items, and with the Atomic Energy Commission. In brief: Z-2 now has the same priority status as the symbols A, B, C, and E, which have been in use by the Defense Dept. and AEC for several weeks.

Tool builders have full authority to use the Z-2 symbol when placing orders for steel, copper, aluminum, and for component parts, such as motors, bearings, and castings.

NPA says Z-2 may be employed as follows:

1. NPA will authorize a tool builder to substitute the program symbol Z-2 for the N-8 symbol.

2. Upon receipt of the authorizing letter from NPA, the manufacturer will revalidate his outstanding orders with the new symbol, and also can use the new symbol in placing his orders.

3. A steel mill, or other supplier of controlled materials or components, on receipt of an authorized order bearing the symbol Z-2, is required to give it the same priority as is now given the A to E coded orders unless his order books for a particular product are filled for that product for a particular month.

Industry Controls This Week:

NPA Orders

M-25, Dir. 2—Orders metal can manufacturers to fill current orders before carryovers.

M-46, Amend.—Defines three types of request for CMP help for oil and gas operators.

M-91—Places selenium under complete allocation.

OPS Orders

GOR 10, Amend. 3; CPR 22 Amend. 36; and CPR 30, Amend. 25—Change details in procedures for applying for ceiling price adjustments.

CPR 22, SR 17, Amend. 1—Permits filing for price adjustments on the product of a single manufacturing unit.

CPR 30, SR 3, Amend. 1—Postpones effective date for some lines.

CPR 30, Amend. 24 and CPR 67, Amend. 5—Redefines "manufacturer" to remove conflicts between these two regs.

CPR 105—Establishes ceiling prices for used rebuilt and guaranteed industrial and construction machinery.

GOR 9, Amend. 10—Exempts several industrial minerals from price controls.

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IT PAYS TO READ IRON AGE ADS TOO!

—Controls—

Defense Work Takes Preference

Theme for the nation's manufacturers, as stated by National Production Authority Administrator Manly Fleischmann: Non-defense work will have to give way to defense production.

Fleischmann announced this general principle when he described new procedures calculated to insure sufficient component parts to keep military and atomic energy production programs rolling. In part, these procedures have the following form:

1. Preferential status for authorized controlled material (ACM) orders bearing symbols A through E and Z-2.

2. Directives will be issued to insure placement of ACM orders for such components and equipment, even though not included in an automatic preference class.

3. NPA will effect "vigorous enforcement to insure deliveries to preferred programs.

4. The agency will compel acceptance of military, atomic energy, and machine tool program orders for B products.

Tin Quotas for Plating Proposed

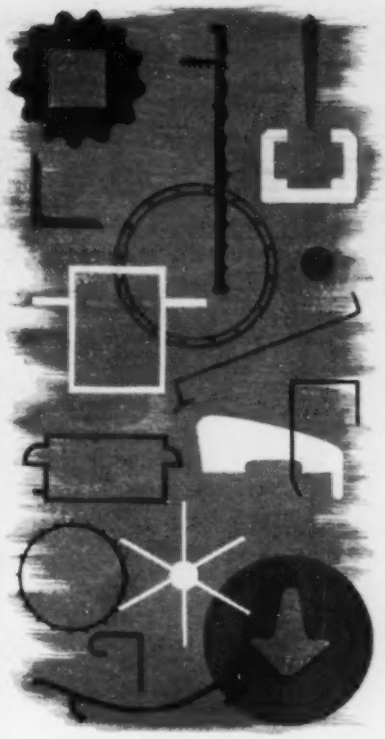
Second quarter 1952 allocations of pig tin for plating use recommended by Tinplate Section, National Production Authority, amount to 7725 gross tons.

Spokesmen for the tinplate industry were informed of the proposed second quarter allocations at a recent meeting with NPA.

Fill Current Can Orders First

Manufacturers of metal cans have been ordered by National Production Authority (Dir. 2 to M-25) to satisfy current demands for cans first and subsequently fill carry-over requirements on a pro-rata basis.

The new order forbids manufacturers to fill any order representing an unused quota for a previous quarter that will delay or displace orders for the current quarter.



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—Controls—

M-46 Sets 3 Types of CMP Help

Three types of materials requests are defined in National Production Authority's newly-revised Order M-46, covering procedures for use by U. S. and Canadian oil and gas operators in getting aid to buy controlled materials. The order is administered by Petroleum Administration for Defense.

Classes of requests are:

1. Those where the total cost of controlled materials is $5,000 or more.

2. Those wherein an operator's combined requirements for line pipe in any calendar quarter for maintenance, repair, operation, production, and small construction total $5,000 or more.

3. Those in which the applicant's combined requirements for line pipe for this work in any quarter total less than $5,000.

Operators will use a new form, PAD-26LP, to get priorities aid on certain purchases of line pipe for small construction, production, and maintenance.

CPR 30 Effective Date Postponed

Some metals products manufacturers, whose lines are going to be covered by tailored pricing regulations, are authorized to postpone the effective date of applying Ceiling Price Reg. 30 (machinery).

New Office of Price Stabilization action, Amendment 1 to Supplementary Reg. 3, CPR 30, grants the option to these lines:

Forgings; conduit; fabricated trackwork; fabricated standard line structural shapes, plates, and related products; mechanical springs; metal stampings; screw machine products; certain pneumatic compressors; tools, dies, jigs, and fixtures; foundry molds and patterns; and certain industrial trucks.

Price Adjustment Regs. Changed

Three pricing amendments, effective Dec. 18, alter regulations whereby manufacturers may get adjustments in ceiling prices.

These changes are Amendment 3, General Overriding Reg. 10; Amdt. 25, Ceiling Price Reg. 30;

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and Amdt. 36, CPR 22. They concern firms showing an overall loss because of ceiling prices.

Amdt. 3, GOR 10, requires that applications for adjustments and any additional requested information be sent to Office of Price Stabilization by registered mail. It also requires the manufacturer to wait 30 days after OPS acknowledges receipt of the data before selling at his proposed adjusted ceilings.

The two additional amendments delete portions of CPR 30 and 22, respectively. This deletion means manufacturers operating at an overall loss must file ceiling adjustment requests under GOR 10.

Ceilings for Heavy Machinery

Ceiling price for used industrial and construction machinery, rebuilt and guaranteed, is established at 85 pct of applicable base price by a new Office of Price Stabilization action, Ceiling Price Reg. 105.

Effective Dec. 17, the order covers several hundred items, including boilers, conveyors, cranes, cutting tools, dies, derricks, dredges, engines, motors, hoists, stokers, and turbines. It determines ceilings for both rebuilt and guaranteed items, and for those sold on an "as is" basis.

Equipment not rebuilt and guaranteed has a ceiling of 55 pct of its applicable base price. If the depreciation method of pricing is used for equipment in this category, the result must be a ceiling of not more than 80 pct of base price.

No Extension Time for CPR 22, 30

No further extension of the mandatory effective date of Ceiling Price Regs. 22 and 30, which attained a "must" status Dec. 19, will be granted by Office of Price Stabilization.

There had been trade rumors that these regulations—the general manufacturers' order and the machinery order—might not have to be complied with on the date named. The Dec. 19 date was specified by OPS on Nov. 9.

Steel Capacity Increases

At a regional technical meeting of the American Iron & Steel Institute held in Chicago last week, Walter S. Tower, president, told attending members that 2.5 to 3 million tons of steel will have been added to the nation's capacity by the end of the year, bringing total capacity to 107 million tons at the start of 1952.

During the coming year about 10 million more tons will be added. Capacity will be increased 2.9 million in the first quarter, 3.7 million in the second and 3.0 million in the third quarter of 1952. The informal remarks were made in response to government inferences that the steel expansion program would not show any sizeable results until the fourth quarter of next year.

Facilities Review Board Formed

Authority for expansion programs may be issued at a little slower pace in the future as Defense Production Administration's newly formed Facilities Review Board gets operating.

Headed by Assistant Deputy Administrator Olaf Tackle, job of the board will be to screen for idle capacity all plants valued at $1,000,000 or more. Negotiation of contracts may follow.

Will Raise Dolomite Output

Construction of two new kilns for production of dead burned dolomite has begun at Basic Refractories' plant at Maple Grove, Ohio. When completed capacity at the Maple Grove plant will reach 800,000 tons per year.

In addition to the two kilns, completely new raw material storage silos and loading stations will be installed. Presently the installation has five dolomite kilns and two magnesite kilns.

Nearly all concrete work is now finished and with favorable winter weather conditions the new kilns should be in operation by the second quarter of 1952.

ARCOS Stainless Electrodes pass rigid quality control tests before you receive them

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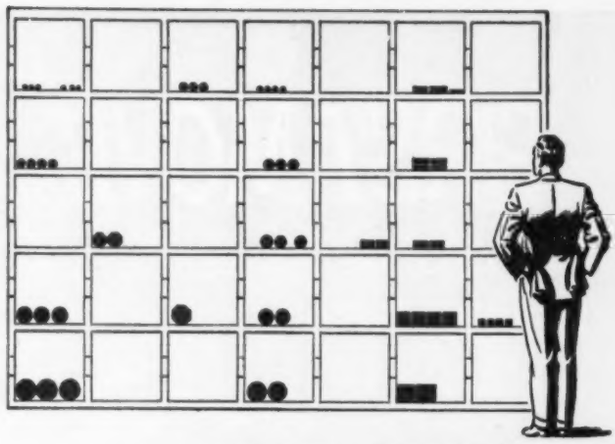

The present serious **STEEL SHORTAGE** has reduced our warehouse stocks of HY-TEN and Standard alloy steels to a sub-normal level.

This inventory situation is, of course, very unsatisfactory but we are doing everything we possibly can to improve it.

Our aim is to allocate available stocks to our customers in the fairest and most equitable way possible.

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In the light of current conditions, we suggest that you put our metallurgical knowledge and experience to work for you.

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—Defense Contracts—

Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address.

Maintenance parts, 4845ea, $112,753, Westinghouse Electric Corp., Philadelphia.

Maintenance parts, 612 ea, $29,239, Consolidated Vultee Aircraft Corp., San Diego.

Ignition, harness assy., 69 ea, $28,073, Titeflex, Inc., Newark, N. J.

Headset: headband type, dynamic, 20,366 ea, $190,111, Permoflux Corp., Chicago.

Compass, 7670 ea, $28,835, Farmar Corp., New York.

Maintenance parts, exceeds $250,000, United Aircraft Corp., Dallas.

Base, antenna mast, 1500, $31,627, Ward Products Corp., Cleveland.

Spare parts f/speed cranes and shovels, 60 items, $30,295, Industrial Equip. Co., Los Angeles.

Spare parts, batteries, 11 items, $79,410, Hobbs Battery Co., Los Angeles.

Repair parts f/truck, cars & engines, 304 items, $82,481, G.M.C. Truck & Coach Div., Pontiac, Mich.

Motorized road grader, 265, exceeds $250,000, Rome Grader Corp., Rome, N. Y.

Relay, pulsating, 1, $51,414, Riverside Electrical Mfg. Co., Dearborn.

Coupling, final drive, 1, exceeds $250,000, Warner Machine Pr., Inc., Muncie, Ind.

Castings, range finder, 2, $82,500, The Belmar Corp., Baltimore.

Bracket, plate, 2, $52,662, Beam Manufacturing Div., Webster City, Iowa.

Box, master junction, 2, exceeds $250,000, Eclipse Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.

Cover, turret lock plunger, 1, $30,029, Seyburn Tool & Eng. Co., Detroit.

Breaker, circuit, 1, $66,797, Spencer Thermostat Div., Attleboro, Mass.

Combination Drill & Reamer, 1, $100,464, Rose Truck & Caster Co., Detroit.

Pipe assy., exhaust outer, exhaust inner, 2, $46,351, Kay Industries, Inc., Detroit.

Machine, Colonial, 5, $139,677, Colonial Broach Co., Detroit.

Mounting bases, 1758, $24,682, The Barry Corp., Watertown, Mass.

1 press, crank, 1 ea, $247,544, Clearing Machine Corp., Chicago.

1 press, hydraulic, 1 ea, $21,712, Hydraulic Press Mfg. Co., New York.

1 .30 cal. brass cartridge case cups, lbs. $186,050, The International Silver Co., Meriden, Conn.

Torpedo propulsion battery, 500, $125,330, Electric Storage Battery Co., Washington.

Cartridge cases (brass), exceeds $250,000, Norris Thermador Corp., Los Angeles.

Parts for U. S. Cal. Rifle, .30 ML, $46,191 Farmers Tools & Supply Corp., Denver.

Fuze, not furnished, Carter Carburetor Co., St. Louis.

Generators, 3 ea, $203,556, The Union Diesel Engine Co., Oakland, Calif.

Diesel engine, 7 items, $51,538, The National Supply Co., Springfield, Ohio.

Cartridge cases, 1000, $113,648, Ekco Products Co., Massillon, Ohio.

Tool sets, complete with tools, 1700, $239,096, Century Tool Co., Palmyra, N. J.

Replenishment of tank & combat vehicle parts, 1760 ea, $40,864, American Thermal Ind. Inc., Detroit.

Replenishment of tank & combat vehicle parts, 1270 ea, $27,762, North Western Auto Parts Co., Minneapolis.

Replenishment of tank & combat vehicle parts, 4530 ea, $140,139, The J. B. Beaird Co., Shreveport, La.

Replenishment of tank & combat vehicle parts, exceeds $250,000, American Generator & Armature Co., Chicago.

Replenishment of tank & combat vehicle parts, exceeds $250,000, Active Gear Co., Chicago.

Replenishment of tank & combat vehicle parts, exceeds $250,000, The Maxim Silencer Co., Hartford, Conn.

Electric motors & repair parts including special tooling, 6959, $120,915, A. O. Smith Corp. Pacific Coast Div., Los Angeles.

Repair parts for gyro compasses, 325661, $75,109, Sperry Gyroscope Co. Div. of Sperry Corp., Great Neck, N. Y.

Repair parts for diesel engines, 2070, $26,891, The National Supply Co., Springfield, Ohio.

Repair parts for turbines, 1903, $26,118, Westinghouse Elec. Corp., Philadelphia.

Valves, 300, $74,775, Spence, Engr. Co., Inc., Walden, N. Y.

Repair parts for valves, 2271, $36,924, Hajoca Corp., Washington.

Repair parts for gasoline engines, 12960, $64,484, United States Gauge Div., Sellersville, Pa.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal, and opening date. (Invitations for Bids numbers are followed by "B," requests for proposals or quotations by "Q").

Walla Walla District, Corps of Engineers, Walla Walla, Wash.
Hydraulic equip., pump, motor, control units, 15 ea, (CIVENGP-52-CQ), Dec. 18.
Anvils, 70 lbs, steel, 1580, 1967Q, Dec. 28.
Tractors, warehouse, gas—2600 lb draw bar pull, trucks, platform-gas, 188, 2447Q, Jan. 2.
Trailers, heavy duty, industrial, 90, 2599Q, Jan. 4.
Blades, hacksaw, high speed, 219300, 5654Q, Jan. 7.
Grinders, surface, 12 x 36 in., 2, 2614Q, Jan. 7.
Nippers, steel, flat, ground face, 5745, 5671B, Jan. 4.
Rudder and stock, main, for 36 ft LCVP armsteerer W Key-steel, 500 ea, 72-24876B, Jan. 4.
Pivot, brake control arm, 35 ea, 72-24876B, Jan. 4.
Bolts, stud, various types, 71700 ea, 72-20490B, Jan. 9.
Bearings, various types and sizes, 56178 ea, 72-24583B, Jan. 4.
Gaskets, diesel engine, 51809 ea, 72-20776, Jan. 7.
Wrenches, engineers, ratchet, socket, tee handle, spanner, box, 4900 ea, 72-25187B, Jan. 8.
Clock, interval timer, 2880 ea, 111796B, Dec. 27.
Pin, horizontal pontoon connector, 3400, (DA-ENG-36-058-52-42B), Dec. 28.
Pin, top, pontoon connector, 6000, (DA-ENG-36-058-52-42B), Dec. 28.
Pin, treadway, plywood, 5000, (DA-ENG-36-058-52-42B), Dec. 28.
Pin, treadway, steel, 2366, (DA-ENG-36-058-52-42B), Dec. 28.

Wright-Patterson Air Force Base, Dayton, Ohio
Screws, washers, shackles, bolts, hinges, nails, and rivets, var, (WF-52-2708-Q), Dec. 26.

St. Louis District, Corps of Engineers, St. Louis
Tubing, steel, pipeline section, 745000, (ENG-23-065-52-417), Dec. 27.
Coupling, pipe, iron, malleable, grooved type, 800000 ea, (ENG-23-065-52-417), Dec. 27.
Valve, cyl., 40 cu ft, 10000 ea, (ENG-23-065-52-421B), Dec. 28.
Alum.—sheet—FSQQ-A561A, 5000 ea, (ENG-23-065-52-422B), Dec. 28.
B Intercommunication station and maint. kit, 72 ea, (YDSO-1026-26-Dec.-51 52).

Naval Gun Factory, Washington
Gages—dial fixture—as per DR, 24 ea, 9536/432, OR-Dec. 51.
Gages—built up snap, 260 ea, 9536/438, OR-Dec. 51.
Shackle bomb, 4 items, 52-370B, Jan. 2.
Rack, bomb, electrically operated, 6 items, 52-372B, Dec. 26.
Buffer and polisher and grinder, 6 items, 52-421B, Dec. 28.
Heater gun—20 MM, 4276 ea, 52-430B, Dec. 27.
Chairs, metal, 7 items, 52-5206Q, Dec. 26.
Transmitter, 8 items, 52-5397Q, Dec. 26.
Cleaner, vapor pressure type, 4 ea, 52-5405Q, Dec. 26.
Heater, forced warm air, oil fired, 30 ea, (04-203-52-646), Dec. 27.

Chicago Procurement Office, Corps of Engineers, Chicago
Tractor—wheel—industrial—size 2 2000 to 2975 lb, 36 ea, A-120Q, Dec. 21.
Tractor—wheel—agricultural, 12 ea, A-120Q, Dec. 21.

General Services Administration, Washington
Buses, 8 ea, 4N-5666-R, Dec. 27.
Harrow plows, 9 ea, (ECA-93-770-00-309-2012), Jan. 7.
Tractor and spare parts, 3 ea, (ECA-93-830-00-301-2014), Jan. 4.
Automobiles, 287 ea, 4 A-5501-R, Jan. 4.
Station wagons, 10 ea, 4A-5501-R, Jan. 4.
Truck, coupe pickup, 1 ea, 4A-5501-R, Jan. 4.
Trailer, van, 1 ea, 4C-5270-R, Dec. 28.
Wrenches, 792 ea, 3K-5066-R, Dec. 27.
Fuse, plug, type, 20 amp. 650 bx, LA-INF-176, Dec. 18.
Gate valves, 2 items, 1781, Dec. 19.

U. S. Atomic Energy Commission, Idaho Falls, Idaho
Electrical supplies, 118 items, 1780, Dec. 19.

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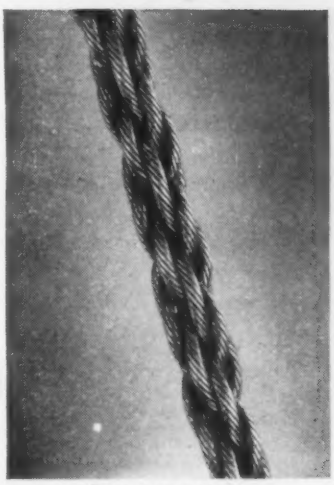

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Steel Inquiries and Awards

Reinforcing Bar Awards this week include the following:

1600 Tons, Philadelphia, piling for Pennsylvania Railroad ore pier, Brawn & Stuart, general contractors, to Bethlehem Steel Co., Bethlehem.

1500 Tons, Philadelphia, contract SE 108, City of Philadelphia Southeast Sewage Treatment Works, Hughes-Foulkrod Co., same city, general contractors, to Bethlehem Steel Co., Bethlehem.

1000 Tons, Tobyhanna, Pa., four warehouses at Tobyhanna Signal Depot, U. S. Army Corps of Engineers, Consolidated Construction Co., Woodbury, N. J., general contractors, to Bethlehem Steel Co., Bethlehem.

700 Tons, Philadelphia, kitchen and dining addition at Philadelphia General Hospital, McCloskey & Co., same city, general contractors, to Bethlehem Steel Co., Bethlehem.

300 Tons, Philadelphia, deck for Pennsylvania Railroad ore pier, McCloskey & Co., same city, general contractors, to Bethlehem Steel Co., Bethlehem.

130 Tons, Salem County, N. J., State Route 44, Sect. 17 A.F.A. Canuso & Son, Philadelphia, general contractors.

Building Claimant Agency

Facilities & Construction Bureau of National Production Authority has been named claimant agency for engineering and construction firms seeking priorities assistance in obtaining equipment necessary in filling defense orders.

Robert F. Crossgrove has been assigned the job of acting on claimants' applications.

Shipyards Get Metal to Expand

Maritime Administration has allocated 3000 tons of carbon steel and 34,000 lb of copper to 10 firms for necessary first quarter work on expansion of shipyard and docking facilities.

U. S. Readies for Steel Strike Action

Threat of steel industry shutdown closes in . . . Ching chooses two arbiters for wage deadlock . . . Wants to move quickly to avert strike . . . Negotiations off schedule—*By G. H. Baker.*

Entrance of Federal mediators into the current wrangle over steel wages actually means much more than the pointing out of a premature deadlock in negotiations.

Cyrus Ching's assignment of two crack arbiters means that there is now the definite threat of an industry-wide shutdown of basic steel production soon. The government is preparing for quick action to avert this, or, failing that, to make a strike short-lived. It wants to be in a prepared position to act as quickly as possible.

Off Schedule—When the government stepped into the wage talks between steel management and the million-member CIO steelworkers' union last week, there had been little evidence that the 2-week-old talks had not been going "according to schedule."

That is now just so much wishful thinking. (See p. 59.)

Some participants in the talks hint strongly that a principal stumbing block in the path of agreement is a United Steelworkers' demand for a guaranteed annual wage plan. Murray W. Latimer, an independent economist who often compiles studies to provide statistical backing to CIO arguments, has admitted that he has "done some work" on a study of guaranteed annual wages for Philip Murray, union leader.

"Whether I do any intensive work on the subject will depend on how the negotiations go," Latimer says.

Reports on Pensions—Government mediation officials are recalling that Latimer prepared a report on pensions for USW-CIO in 1949. Within a few months following completion of his report, the union wrested a $100-per-month pension set-up from steel management.

Ching's interest in the negotiations revealed itself in his assignment of Clyde M. Mills, his assistant mediation director, and Walter A. Maggiolo, acting general counsel for the Federal Mediation Service, to the Pittsburgh talks.

Ching flatly declined this week to deny that he has assigned his trouble-shooters to the case because negotiations were nearing a break-down point.

Despite all the denials, it is a known fact that all is not well around the negotiation table. Reconciliation of differences within the next 10 days will spell the difference between continued high-speed production for rearmament or a possible breakdown of steel production.

Quote of the Week:

Defense Mobilizer Wilson at a Washington meeting at the National Press Club last week: "We are entering perhaps the most critical period of the stabilization effort in terms of current wage negotiations. I don't think I exaggerate when I say that success of stabilization and mobilization programs hangs in balance.

"I have read in 'dope sheets' that we are going to scrap our wage control policies to avert strikes in key industries. We must and will maintain wage control to prevent a spiral of wage - price inflation which would be just as damaging to labor as to every other group in the economy."

Loan Cooperation—New procedures for handling government loans to small businesses will demand a considerable degree of cooperation between Reconstruction Finance Corp. and Small Plants Administration.

Loans are those from the $100,000,000 fund provided by Section 714, Defense Production Act. This section empowers SDPA to recommend to RFC loans for the use of small firms in defense and essential civilian work. RFC will determine terms, conditions, and maturities of such loans.

Jointly, the agencies worked out three steps to speed handling of loan requests. It was decided that:

1. Applications will be filed at RFC field offices.

2. Standard RFC loan forms will be used, and applications will be processed in conformity with RFC practices.

3. RFC will ask for SDPA recommendations to permit both agencies to consider applications simultaneously.

Renegotiation — Four regional offices of the U. S. Renegotiation Board will be opened early in 1952.

Sites of the 5-man boards will be New York, Washington, Chicago, and Los Angeles. Their work will be to carry out provisions of the Renegotiation Act of 1951 in recovering possible excess profits on mobilization awards.

The Army, Navy, Air Force, and General Services Administration will appoint one board member each. Renegotiation Board will name the chairman. To promote liaison between the group and the various buying agencies, the board has established a separate Office of Procurement Affairs.

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ALUMINUM: Shortage to Continue

Increased aircraft production will keep demand high . . . DPA feels Anaconda's Kalispell proposal best way out . . . Ignore Interior and Justice fears of restrictions on competition.

Aluminum shortages, far from being nearly over, will extend throughout 1952 and into 1953, largely as a result of unexpectedly great requirements for added supplies to be used in military aircraft production.

This prospect was a major factor in Defense Production Administrator Manly Fleischmann's approval of Anaconda Copper's proposal to build a 72,000-ton aluminum reduction plant at Kalispell, Mont.

Fleischmann made his decision despite objections by Interior Secretary Oscar Chapman and Justice Dept. that Anaconda's entry into aluminum production would tend to reduce competition in metals. He pointed out that Defense Mobilizer Charles E. Wilson approves his choice.

Best Way—Governing factor in backing the Anaconda plan, in which Harvey Machine Co. is a junior partner, is Fleischmann's belief that it is the "best arrangement from the government's point of view." These reasons, he said, make it so:

(1) It is the fastest way to get more primary aluminum.

(2) There is no financial assistance accruing to Anaconda, except for the rapid tax write-off privilege, under "favorable" consideration.

(3) The "most likely alternate" (possibly Olin Industries) wants to build large, expensive fabricating facilities not now needed.

(4) Anaconda, "of all the applicants . . . has the highest degree of competence in metallurgical fields."

Plenty of Room—No stock was taken by Fleischmann in the Interior Dept. argument that, aluminum and copper being competitive in many applications, Anaconda might be entering a new field merely to restrict, rather than promote, aluminum output. He reasoned that there will continue to be "adequate markets" for short-supply copper in fields where substitution of other metals is neither economical or possible.

Fleischmann's approval action forced the hand of Interior Dept. Shortly after the DPA announcement, Acting Sec. Richard D. Searles said he had authorized Bonneville Power Administration to negotiate the contract, involving a meeting with Anaconda representatives. Power would be supplied from Hungry Horse Dam, Mont.

Acceptance of Anaconda as a primary aluminum producer, through a subsidiary, takes off the government's books Harvey Machine's application for a $46,000,000 loan. A DPA certificate granted to Harvey last Mar. 8, allowing fast tax writeoffs of a proposed total investment of $94,700,000, is still on the books.

DMPA Loan to Boost Zinc Output

Domestic zinc production got a boost last week when Defense Materials Procurement Agency agreed to advance $45,000 to MacArthur Mining Co. for expansion of the firm's facilities near Baxter Springs, Cherokee County, Kan.

DMPA says the company will use the money to double its present production of 325 tons of ore per day. The increase will result in production of 500 tons of zinc concentrates per month, which also is double the firm's present production capacity.

Pay Back—MacArthur will repay the advance at the rate of $16 on each of the first 250 tons of zinc concentrates produced by the new facilities each month until the government's advance is paid.

DMPA agrees to buy up to 1500 tons of slab zinc at 17.5¢ per lb if the company cannot sell it on the market. The advance permits the firm to finance new output and the price agreement assures a market.

Box Score on Steel's CMP Recommendations

To what extent has the operation of government controls over steel been improved in recent months? A spot check shows that still imperfect machinery is now running more smoothly—a condition due in large part to the government's adoption of a majority of recommendations (THE IRON AGE, Oct. 18, p. 75) submitted to Defense Mobilizer Wilson by a committee of steel producers. The following box-score shows the standing—as of this week—of each of the principal recommendations presented by the producers' committee on Oct. 11:

RECOMMENDATION	NOW IN EFFECT	STILL IN TALKING STAGE
Set up a staff to examine status of construction projects	X	
Require CMP applicants to state previous-quarter usage and inventories in tons		X (But dollar-volume now is required)
End military practice of delivery in advance of need		X
End 10-pct reservation until 15 days prior to lead time	X	
Spread military orders among all firms		X
Restrict allotments to 110 pct of supply	X	
No duplicate orders	X	
Government inform industry of long-range goals	X	
Study problem of conversion steel	X	
Issue tax certificates promptly	X	
Assure delivery of materials for expansion	X	
No-strike pledge		X
Higher steel prices if wages climb	?	?
Set single ceiling price for 5 grades of openhearth scrap	X (3 grades)	

Industrial Briefs

New Company—The formation of a new company, HEPPENSTALL INDUSTRIAL SERVICE CO. will serve as consultants in the application and installation of modern techniques in the forging, steel processing, steel fabricating and paper industries. C. W. Heppenstall is founder and president.

Good Business — Pittsburgh district business rose to the highest levels since January in the week ended Dec. 1. The University of Pittsburgh's BUREAU OF BUSINESS RESEARCH said its seasonally adjusted index rose from 198.0 of the 1935-39 average to 206.6.

Amalgamation Anticipated — Two motorcar manufacturers in Britain, MORRIS MOTORS and the AUSTIN MOTOR CO. plan to amalgamate. The two companies will retain their separate identities and will not produce the same models. The merger is a sign of the times, because of intensifying competition from the United States and European firms.

Increasing Production — MACKLIN CO., Jackson, Mich., manufacturers of grinding wheels, is increasing its production capacity by more than 35 pct. Additions are being made to the Finishing Department, Inspection Department, Resinoid Oven Department and Vitrified Kiln Department.

Navy Action—The Navy announced that a $1.3 million building to house submarine battery overhauling activities at the Portsmouth, N. H., Navy Shipyard will be constructed during 1952. The two-story concrete structure will be equipped with its own power plant and special penthouse for acid vats.

Invitation Accepted—Dr. J. C. Warner, president of CARNEGIE INSTITUTE OF TECHNOLOGY, has been invited to deliver a series of six lectures at the Tata Iron & Steel Co., Ltd., Jamshedpur, India. Dr. Warner leaves New York on Dec. 15.

Yearly Bonus—Incentive and service bonuses amounting to 15 pct of total wages earned during the fiscal year ended Oct. 31, have been distributed to all employees of UNIVERSAL METAL HOSE CO., Chicago.

Construction Started — Ground was broken recently, near Tuscola, Ill., for the new plant of NATIONAL PETRO-CHEMICALS CORP. The new plant costing approximately $32 million, is being built primarily for the recovery of ethane from natural gas. This ethane will be converted into ethylene from which synthetic industrial ethyl alcohol and ethyl chloride will be produced.

Boosts Tool Output—A new addition to the COLONIAL BROACH CO. factory, Detroit, has been completed. The addition increases machine construction plant area 30 pct. A horizontal boring mill, a planer and other heavy duty grinding and machining equipment including a 20-ton crane has been installed.

Merger Proposed — ELASTIC STOP NUT CORP. OF AMERICA and the AMERICAN GAS ACCUMULATOR CO., have signed an agreement of merger. Special meetings of stockholders of both companies will be held early in February, 1952, to consider and act upon the merger proposition.

Services Available — New home of CUMMINS DIESEL SALES OF MONTANA, INC., is located at 4322 State St., Billings. New facilities include complete engine overhaul equipment, an engine and chassis dynamometer, engine rebuild and engine exchange units.

Export Headquarters—ACME STEEL CO. export headquarters will be moved early next year to the State-Madison Bldg., 22 W. Madison St., where the company's two foreign sales subsidiaries have leased office space.

Plans Transfer—Babcock & Wilcox Tube Co. plans to transfer its assets and business to Babcock & Wilcox Co., its sole stockholder on Dec. 31. The business will then continue to be operated as the TUBULAR PRODUCTS DIVISION of the Babcock & Wilcox Co.

Sales and Service—The new sales and service branch of the BLACK & DECKER MFG. CO., will be located at 2432 So. Broadway, Los Angeles. Occupancy of the new building is expected early in January.

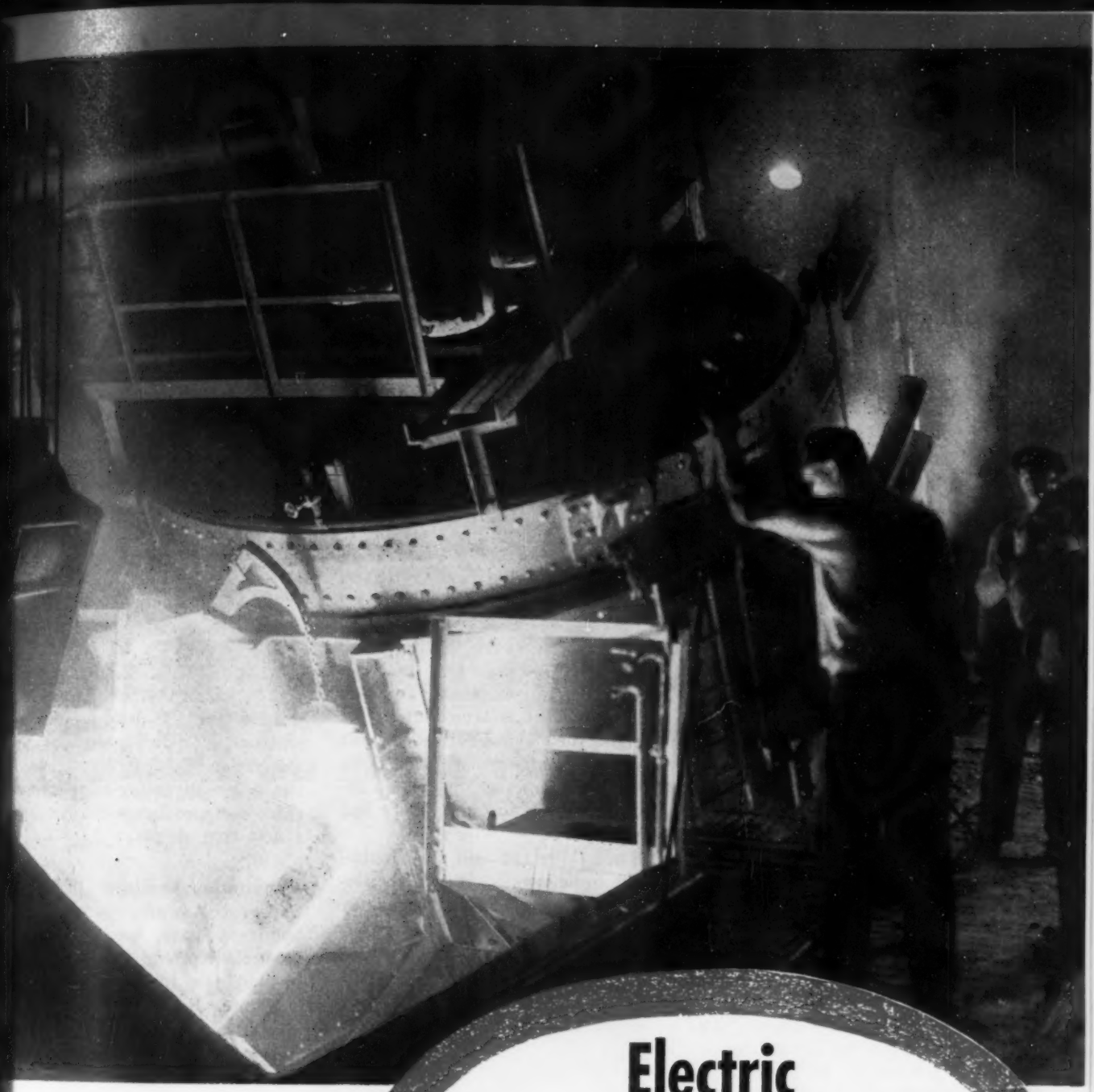
Defense Contract — MINNEAPOLIS-MOLINE CO. has been awarded a contract for the reactivation and operation of a government-owned shell plant located in the Twin Cities arsenal area at New Brighton Minn. The reactivation and equipment contract is approximately $2 million. The plant will produce artillery shells for the Army.

Philippine Order—Manila Electric Co. has ordered three unit power plants, with capacities totaling 20,000 kw, from WESTINGHOUSE ELECTRIC INTERNATIONAL CO. for installation at its Blaisdell station.

Property Purchase — EDGECOMB STEEL CO., Philadelphia, has purchased about four acres of property in Greensboro, N. C. The company is a metal service organization handling aluminum, brass, carbon steels, stainless steels and tool steels.

Expansion Completed — PRECISION SHOT CO., Birmingham, Mich., has completed expansion of facilities for their new Shot Peening Div.

Branch Office — REPUBLIC FLOW METERS CO. has opened a factory branch office at 2426 W. Holcombe Blvd., Houston. George H. Woodard will be office manager.



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Predicts Deeper Cuts in Employment

Mobilizer Wilson sees no immediate relief . . . More layoffs due in first quarter . . . Governor eyes conversion steel as output stimulus . . . Auto prices hold line—*By W. G. Patton.*

In a speech at New Orleans last week, Defense Mobilizer, C. E. Wilson, made it clear that additional employment cuts are in prospect. No relief is promised before the end of the second quarter of 1952, Wilson said.

Meanwhile, UAW-CIO officials say more than 100,000 workers are now idle in Detroit alone. They expect further layoffs during the first quarter of 1952.

Government statistics show that employment in the automobile industry dropped 114,000 between March and September. The trend has accelerated since that time. Change-overs to new models, inventory and production cutbacks are responsible.

Better in '52?—Automakers and many of their suppliers are sending letters home to their workers these days, saying in effect, "We hope things will be better during 1952." Consensus at Detroit is there will be more layoffs during the first quarter. No hope is held out for a fast enough pick-up in defense production.

Production for defense is climbing—but slowly. Noticeable effect of defense on Detroit's economy is just beginning.

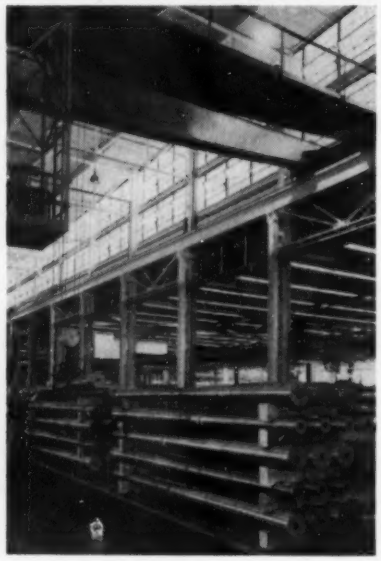
This has been a good year for most auto workers. However, the year end is a disappointment to many thousands who have had steady work practically since the end of World War II.

Employment Confab—Last week Michigan's Governor Williams and Sen. Moody (D., Michigan) met in Detroit with representatives of the motor car industry to discuss the employment situation. The youthful Governor has held similar conferences with CIO and AFL officials.

This week he will attempt to persuade Washington officials that a critical employment situation is certain to develop in Detroit before next spring.

Conversion Steel—The Governor has his eye on conversion steel as a possibility for increasing automobile output. It is true that ingots suitable for making flat-rolled sheet steel are plentiful in Detroit. This is not true, however, of hot top ingots, used for forging billets and alloy bars.

Thus there are still steel bottlenecks to be broken. Biggest bottleneck of all—copper and brass for radiators — is growing tighter.



IN STORAGE: Partially machined tubes for 90-mm. tank guns are in storage at General Motors Corp.'s Oldsmobile Gun Plant at Lansing Mich. The overhead crane is used to move the 15-foot tubes, which weigh more than a ton when they are received as steel forgings from the government.

Even with cold-rolled sheets easier, the industry's prospect for getting boosts in production can hardly be described as "good."

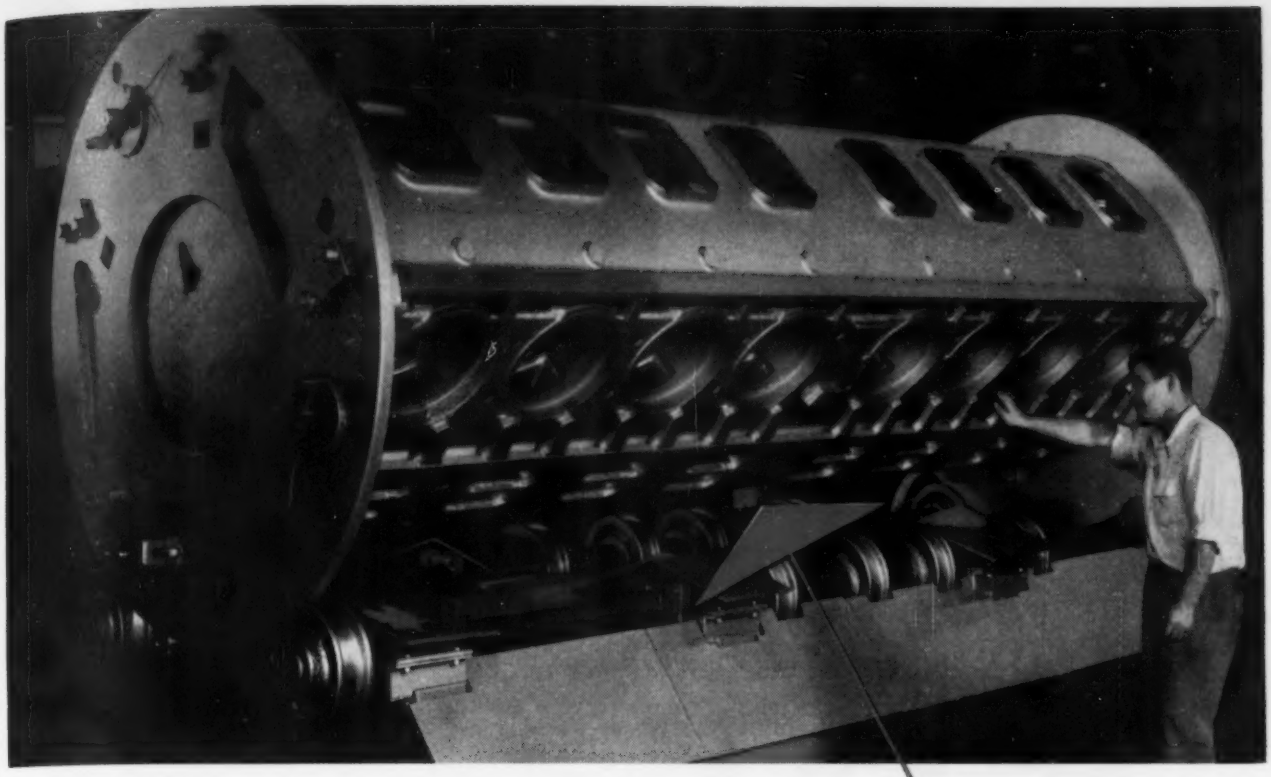
Tardy Priorities — The government order giving manufacturers of machine tools top priorities in essential materials comes a little late. Most Detroit observers saw a bottleneck developing in machine tools many months ago when the warehouse steel situation became critical.

Machine tools are the tightest defense item. The amount of steel used by machine tool builders is relatively small. There are many tight spots in the machine tool production line — patterns, foundry castings, electrical controls, copper, manpower. Solving the steel problem won't altogether solve the machine tool problem — it just isn't nearly that simple.

Invitation Declined—Under the Capehart Amendment, car manufacturers have been invited to boost their prices. Some have done so—but the increases have been moderate. Here's why: (1) Growing buyer resistance; (2) labor and material cost increases since July 28 cannot be included; (3) the present fadeout in conversion steel is providing a nice, fat cost cushion for the industry.

Although the easing of demand is seasonal in part, buyer resistance is rising sharply. Few prospective car purchasers are scaring over a threatened car shortage. Assuming 25 pct of an auto firm's steel comes from conversion and the average premium paid is $100 per ton, the saving on a car requiring 3000 lb of steel would be $37. The industry is not out of conversion yet — but a very fast retreat is being made.

Small Changes—Chrysler's 1952 models introduced last week contain a few refinements but no major changes. Features heretofore avail-



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The speed and ease with which these huge railroad diesel engine weldments are cleaned is almost unbelievable. It takes only one man with a hoist to load a weldment on the work car of the Wheelabrator Room and the rest of the cleaning cycle is *entirely automatic.* In just 32 minutes the weldment emerges from the cabinet spotlessly clean both internally and externally. Thus one man handles the entire daily production — a job that formerly required 16 men operating two airblast rooms, in two plants of a prominent diesel engine producer, for a total of 128 manhours daily.

These weldments are about the most complicated welded job ever produced. They measure 44" x 53" through the cross section and vary in length from 55¾" to 146¾". Cleaning is required for removing welding flux, spatter, mill scale and a light heat treat scale.

There is no comparison between the thoroughly and uniformly cleaned surface now achieved in the Wheelabrator and the job formerly done by airblasting. Inspection has been simplified. Costly trucking and handling has been eliminated. More importantly, the overall cost saving is tremendous.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT

Strategic Materials S-T-R-E-T-C-H Farther

in "COMPO"® and "POWDIRON"®

BEARINGS AND PARTS

When hard-to-get metals are processed by Bound Brook powder metallurgy to form "COMPO" (porous bronze) and "POWDIRON" (sintered iron) bearings and parts, there's no waste of strategic materials. The metals go *farther*, to serve Bound Brook customers *better* — and to aid the defense program.

"COMPO" and "POWDIRON" bearings and parts need no machining, leave no scrap — at Bound Brook or on the user's assembly line.

For latest list of stock sizes of "COMPO" bearings, write us on your company letterhead. Consult our Engineering Department on parts and special bearings.

SEND FOR THIS FREE BOOKLET TODAY

BOUND BROOK

OIL-LESS BEARING COMPANY

BOUND BROOK, N. J. • BOUND BROOK 9-0441

ESTABLISHED 1883

"COMPO" • "POWDIRON" • "BOUND BROOK"

(Advertisement)

POWDER METALLURGY

CONSERVES MATERIALS

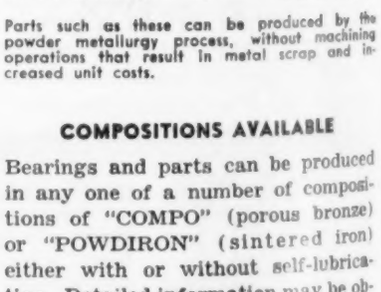
As the channeling of strategic metals into essential applications takes on increasing importance, the material-conserving advantages of powder metallurgy processes are receiving added attention.

In powder metallurgy, parts are die-formed to their final dimensions within extremely close tolerances. This does away with the need for machining operations which result in scrap metal.

INTRICATE SHAPES

The advantages of the powder metallurgy process are of particular importance in the production of intricate structural shapes, which would normally involve extensive and complex machining, with a large amount of scrap. Gears, cams and many other parts are successfully produced, without machining, by the powder metallurgy process.

In addition to making most effective use of critical materials, the powder metallurgy process, by eliminating costly machining, reduces unit cost to the purchaser. Since the production of special shapes requires tooling, the low-cost advantage is most marked in high-volume work, where initial tooling charges are offset by subsequent savings in unit costs.



Parts such as these can be produced by the powder metallurgy process, without machining operations that result in metal scrap and increased unit costs.

COMPOSITIONS AVAILABLE

Bearings and parts can be produced in any one of a number of compositions of "COMPO" (porous bronze) or "POWDIRON" (sintered iron) either with or without self-lubrication. Detailed information may be obtained from the manufacturer, Bound Brook Oil-Less Bearing Company, Bound Brook, N. J.

able only in certain models have been extended to cover the entire Chrysler line. No major body changes have been made.

Like other manufacturers, Chrysler is eliminating body styles having relatively low volume. However, the company will continue to offer 18 bodies to customers.

New V-8 engines have been extended to all models except the Windsor and Windsor Deluxe lines.

During 1952 Chrysler will offer Hydraguide steering on all models. A change in the Oriflow shock absorbers, introduced in 1951, has made possible quieter operation. New wheel covers and a new taillight have been added. All models have new interior styling.

Olds Makes 90-mm Tank Guns

Oldsmobile Div. announced officially last week the company is now in production of 90-mm high velocity tank guns. More than 228,000 sq ft is devoted to gun production for Army Ordnance.

Approximately 200 machine tools remain on order. Two-shift production is planned after full production is achieved. Oldsmobile is fabricating the breech ring, breech block and the 15-ft tube.

More Shells from Chevrolet

Chevrolet will double its original contract for shell production at St. Louis. Plans have been made to add 1300 additional workers by starting a second shift.

Most of the workers have been transferred from Chevrolet - St. Louis assembly plants. Present employment is 1536. The company has been turning out shells at St. Louis since June 8. Chevrolet's original contract was for more than $25 million.

"Zig-Zag" Rides to Popularity

The "Zig-Zag" spring continues to find wide acceptance in the automobile industry. Last week Reynolds Spring Co., Jackson, announced realignment of its facilities to produce Zig-Zag springs in addition to regular type springs.

Although estimated production figures were not available, the company indicated this will be a substantial production item by the spring of 1952.

Expand Chrysler Orleans Plant

Chrysler's tank engine plant at New Orleans is being expanded from 1,200,000 sq ft to 1,800,000 sq ft. Approximately 800 Chrysler workers are currently employed in New Orleans. Eventually, an estimated 6000 persons will help Chrysler build tank engines at New Orleans.

In Time to Avert Tire Shortage

The rubber industry is celebrating a government announcement that Washington will stop allocating American-made general-purpose rubber. Industry claims the announcement comes just in time to avoid a shortage of tires that would have occurred next summer.

With restrictions off, tire manufacturers say they plan to produce at least 71 million passenger car tires in 1952, an increase of 5 million over this year. With decreased passenger car production, estimates place the number of tires available for replacement on passenger cars between 8 and 10 million next year.

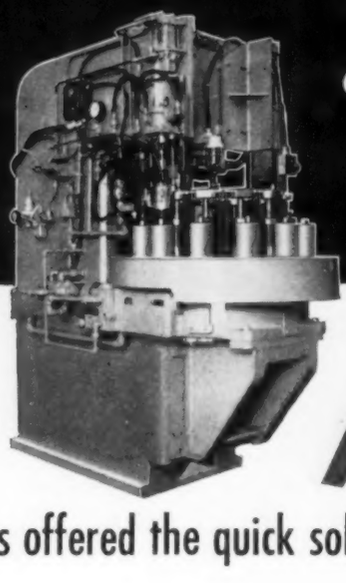
Another happy result of the Washington announcement: Car manufacturers will once again make second-line tires which are sold at lower prices than top quality tires.

Chrysler November Sales Down

Chrysler sales during November, 1951, totaled 97,898 units compared to 161,871 a year ago. Due primarily to the 1950 strike, comparative Chrysler sales figures for 1951 and 1950 appear to be favorable. The 11-month total for 1951 is 1,319,243 vehicles compared with 1,238,716 a year ago. It should be noted, however, that November sales dropped nearly 40 pct behind those of the same month a year ago.

THE BULL OF THE WOODS — **By J. R. Williams**

AND ON THIS PAGE WE HAVE THE HOUSINGS AND TRUCKS FOR THE MAIN HOIST-- NOW HERE YOU SEE--
JUST WHEN YOU GOT A NICE CUT GOIN' AN' CAN DREAM AWAY AN HOUR OR SO, ALONG COMES ONE O' THEM CAREER BOSSES AN' SHOWS YOU HOW TO BUILD A WHOLE 450-TON CRANE!
THEY DON'T STAY WITH ME BUT A MINUTE-- MY WIFE ALWAYS HAS ME SELLIN' TICKETS FOR THINGS!
12-21
J.R.WILLIAMS
T. M. REG. U. S. PAT. OFF.
GETTIN' THE WORKS
COPR. 1951 BY NEA SERVICE, INC.



WHAT'S *YOUR* PROBLEM on Ordnance Production?

MULTIPRESS®

has offered the quick solution for others – *FASTER, BETTER and at LESS COST!*

The fast, flexible, oil-hydraulic *power-control* of Multipress makes it quickly adaptable to the widest range of ordnance work —as typified by the list at right. Built in eight basic frame sizes, in capacities of 1 to 50 ton, and with choice of ram control—*plus design that lends to tooling of widest variety*—Multipress can be delivered and on your production line in the shortest possible time. Doing the job faster, better and at less cost! And it gives you a standard production machine that is always easily reconverted to civilian production at any time. Write today for details on Multipress and our facilities for helping you solve your ordnance production problems.

The DENISON Engineering Co.
1158 Dublin Rd., Columbus 16, Ohio

Typical Ordnance Items

PROJECTILES 20 TO 155 MM.	MINES	CARTRIDGE CASES
FIBRE CONTAINERS	BOMBS	PERCUSSION PRIMERS
METAL CONTAINERS	SIGNALS	FUSES
CANVAS BAGS	BURSTER TUBES CASINGS & IGNITORS	ROCKETS

Typical Production Operations performed on this Ordnance Work

BANDING	SIZING	INSERTING
MARKING	PRESS FIT ASSEMBLY	BLANKING
STAKING	CRIMPING	DRAWING
SWAGING	FORMING	TRIMMING
PIERCING	FLARING	PREFORMING
ASSEMBLY	CLINCHING	TESTING (HYDROSTATIC)
COMPACTION	RIVETING	STAMPING
LOADING	NECKING DOWN	CLAMPING

1 TO 50-TON CAPACITIES
8 FRAME SIZES

DENISON Hydr OILics

Eastern Steel for Western Ships

Government directives expected to bypass West Coast mills ... Stop orders hit airframe output ... Scrap shortage closes rolling mills ... Plan Kalispell power—*By R. T. Reinhardt.*

Not much of the 36,000 tons of steel to be built into the five Mariner Class ships by Bethlehem Pacific Coast Steel Corp., shipbuilding division, will come from western mills.

T. C. Ingersoll, general manager of the division, is proceeding with construction plans on the assurance of Vice Admiral Cochrane, chairman of the Federal Maritime Board, that steel would be allocated to the project at the rate of 10,000 tons per month starting in the second quarter of 1952. Construction was to have started last September, but steel allocations were cancelled. Bethlehem had hoped for 19,000 tons per quarter.

Both Kaiser Steel Co. and Geneva Steel can make the needed plate and could get the rolls for ship channels. However, government directives will probably name the producer and both of these western mills are booked well ahead on plate.

Spring Start—Plans are now to start construction in April or May of 1952 with three ships on the ways at one time. Employment will be increased from the present 2100 to about 5 or 6 thousand at the peak. All five ships are to be completed in 2 years.

Bethlehem's bid of $9,493,000 per ship was lowest on the Coast but about 2½ pct higher than the highest eastern yard bid. Reasons for the higher costs of western shipbuilding include higher labor costs, starting production after a dead stop, and high freight costs on steel and equipment being brought from the East.

Slowdown—Small subcontractors to the airframe industry of southern California are being hard hit by "stop" orders in two major plants. While explanations aren't forthcoming from the airframe builders, it is believed the government has put the brakes on some production temporarily to permit modifications of designs.

In other small shops the lack of defense orders is beginning to affect employment. One metalworking company has had to let 200 men go and others are cutting back for lack of materials.

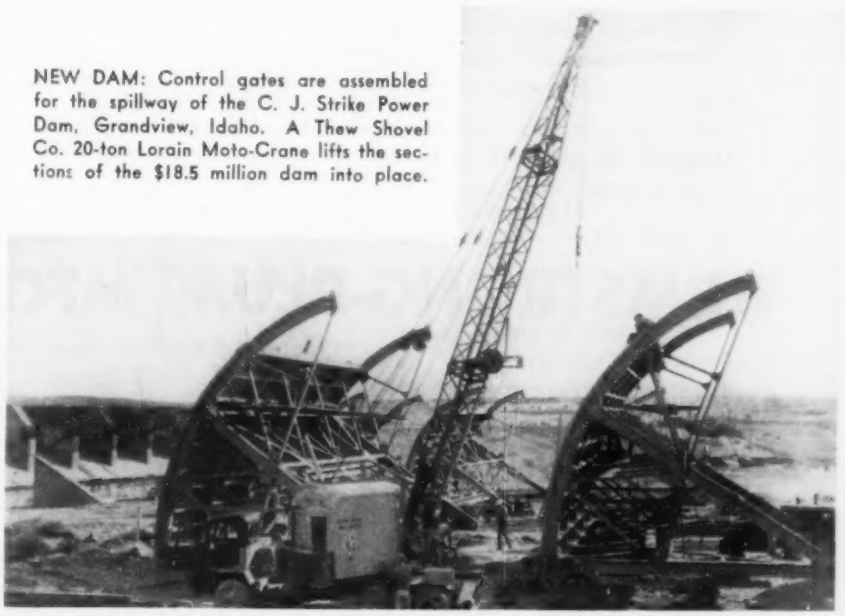
Airframe manufacturers themselves, however, are still building payrolls and overall employment continues at record levels.

Scrap Pinch—Northwest Steel Rolling Mills of Seattle is closing its rolling mills this week until Jan. 7 because of a lack of ingots. This plant has historically had excess rolling capacity but the current shutdown is attributed to scrap shortage. They are on the prowl for scrap in southeastern Alaska now, but winter weather is holding up collections. Furnaces will be kept going as scrap shipments permit.

Isaacson Iron Works of Seattle will start shipping about 250 tons of the scarce ingots to England this week on the Danish motorship *Erria*. Total sales of ingots to England are expected to extend beyond 42,000 tons.

Down to Cases—Last week officials of Anaconda Copper, Harvey Machine Co. and Bonneville Power Administration talked over electric power supply after the government's go-ahead on the Kalispell, Mont., aluminum reduction plant. (See p. 75.)

Outside Alumina—A reduction plant will be built at Kalispell but there is now considerable doubt that an alumina plant will be built in the Pacific Northwest to supply it. Some believe Anaconda-Harvey will get its alumina from Aluminum Corp. of America's present plants until Alcoa gets around to developing its alumina-clay holdings in Oregon.



NEW DAM: Control gates are assembled for the spillway of the C. J. Strike Power Dam, Grandview, Idaho. A Thew Shovel Co. 20-ton Lorain Moto-Crane lifts the sections of the $18.5 million dam into place.

"MARVEL" HAS always had the edge

MARVEL High-Speed-Edge Blades assure Faster, more Accurate cutting with proven Economy and complete Safety. Only the MARVEL is a composite blade with a high speed steel cutting edge electrically welded to an exceptionally tough, strong alloy steel body.

The High-Speed-Edge does the cutting while the alloy back, with hardened eyes, carries the load. Blade tensions up to 300% higher than those possible with ordinary blades are recommended. This greater tension is confined to the cutting or leading edge by the location of pin holes (exclusive MARVEL design feature) and cannot be overcome by work resistance. Heavier feeds and greater speeds are practical without "run out."

With greater accuracy, higher production and lower cost per cut, comes the extra dividend of Safety, for MARVEL High-Speed-Edge Hack Saw Blades are Positively Unbreakable—*they will not shatter.*

Ask your local MARVEL distributor (see classified phone book) to help you modernize your metal sawing with MARVEL High-Speed-Edge Blades. They cost no more than ordinary blades.

1. High-Speed-Steel cutting edge.

2. Tough unbreakable alloy steel body with hardened eyes.

1 & 2. Integrally welded to make a fast-cutting, long lasting composite blade that is *positively unbreakable.*

ARMSTRONG-BLUM MFG. COMPANY

"THE HACK SAW PEOPLE"

5700 BLOOMINGDALE AVENUE **CHICAGO 39, ILLINOIS**

Metal Cutting MARVEL SAWS

Better Machines—Better Blades

Tools Share Top Priority Billing

New Z-2 rating puts machine tools on top of the list with military and AEC . . . But it's not the sought super-priority . . . Precision bearings short . . . Tool cut-off—*By G. Elwers.*

On Aug. 17, C. E. Wilson, mobilization boss, announced the machine tool industry was going to get a super-priority for materials. That priority still has not been granted.

But at least the new Z-2 rating restores the machine tool industry to equality with the military and Atomic Energy Commission in the scramble for scarce metals. This equality was lost about 4 months ago when the A, B, C, and other ratings were instituted. At this time, machine tools were assigned an N-8 rating which was, in effect, about a third-ranking priority. Now, with its Z-2 rating, the industry is back at the top of the list, though it has to share star billing with the military and the AEC.

Bearings Shortage—Two of the crippling shortages most frequently mentioned by machine tool builders lately are plate and bearings. The new priority rating should help mightily in obtaining both of these items. The military is a large user of plate, and with its higher priority these last few weeks, has been grabbing the lion's share.

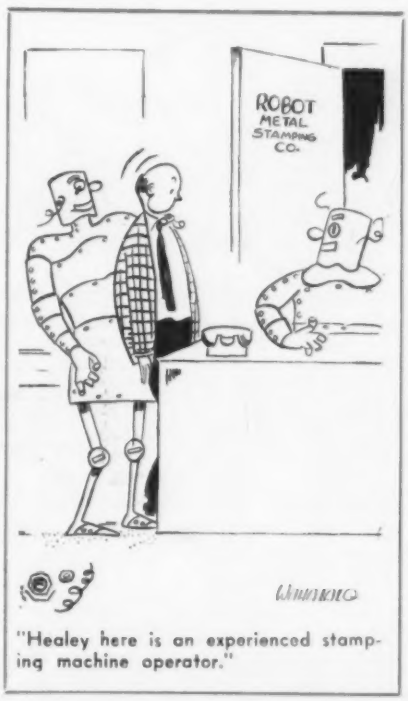
The situation on precision bearings is particularly bad. In many cases, so-called precision bearings are not deliberately manufactured to precision standards. They are just standard bearings which happen to have been accurate enough to meet the precision standards. Thus it is not easy to expand production of precision bearings.

Less to Standards—In fact, due to lower labor quality in these days of labor shortage, the percent of bearings which meet the precision standards is likely to drop, not go up.

Machine tool builders are resorting to all kinds of makeshifts to get around the precision bearing shortage. One dodge is to grind spindles to fit available bearings, instead of ordering bearings to fit the spindles.

Tax Writeoffs — In the last 2 months, 67 certificates of necessity have been issued to machine tool builders for plant expansion. Most were relatively small. The biggest was $5 million, issued to the Gleason Works, Rochester.

Ford Rebuilds—An impressive machine tool rebuilding program is underway at Ford Motor Co.'s huge tool and die shop at the Rouge plant. For its own plants, as well as under subcontract from Pratt & Whitney, Ford is rebuilding about seven used machine tools a month.



"Healey here is an experienced stamping machine operator."

Not only are these machines being completely rebuilt and reconditioned, but in some cases Ford is redesigning them to do work other than that for which they were originally intended.

Caught Short—Apparently some makers of big special machine tools, such as transfer machines, have been caught in embarrassing positions by the cutoff of non-rated machines due Feb. 1. Some are by now entirely converted to defense business, but others are definitely not in such good shape.

At a meeting in Washington over a year ago special toolmakers were asked how soon they could finish up the non-rated business they had in progress. All guessed they could be done by summer or fall. But it looks as if in some cases work was seriously delayed, or else more was started. Possibly pressure from automakers kept work going as long as possible on some machines.

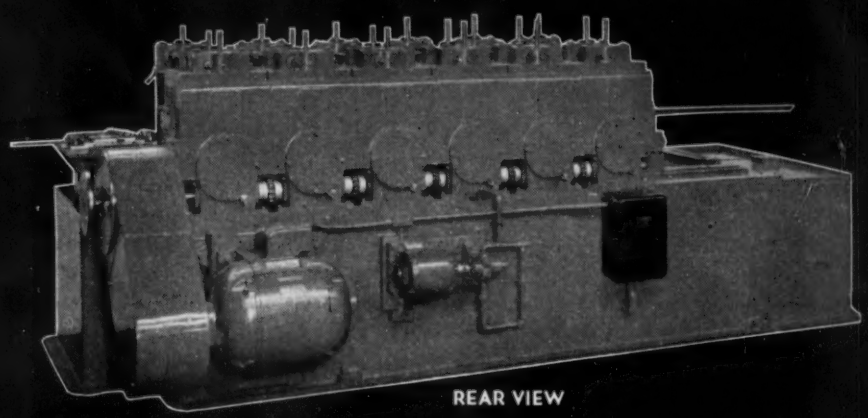
Yet one builder who hasn't done non-rated work since fall reports automakers were very understanding about allowing him to shelve their projects.

Apprentice Training — Additional scholarship benefits are being incorporated into the apprenticeship training program at Warner & Swasey Co., Cleveland. Apprentices are already eligible to take an all-expense-paid night study program at Fenn College along with their apprentice training. Now, graduate apprentices will be eligible for 2-year scholarships at a college or university of their own choice. With their previous night study, these 2 years will be enough for a degree.

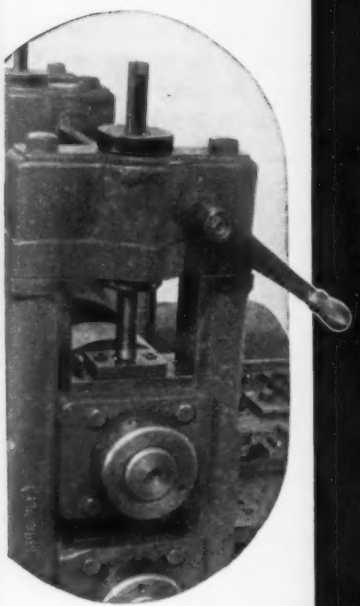
McKAY

ROLL FORMING MACHINES FOR PRODUCING SHAPES FROM FLAT STRIP.

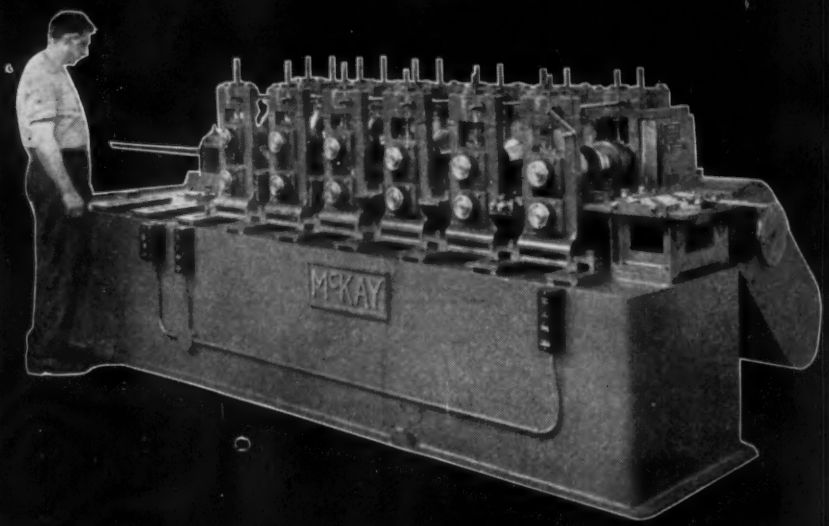
There's a McKAY Machine to Make Every Section



REAR VIEW



McKAY MICROMETER (patented)



STANDARD FEATURES

MICROMETER ADJUSTMENT. All pressure points on top shaft controlled by simple crank motion, through worm and gear reduction. Top shaft is ALWAYS PARALLEL. Micrometer dial furnishes visible check on roll pressures.

TYPICAL RUGGED McKAY CONSTRUCTION. Standardized units, choice of gearing, anti-friction bearings throughout, all gears between bearings, NOT OVERHUNG.

INTERCHANGEABLE GUIDING EQUIPMENT, easily adjusted, quickly removable.

MINIMUM CHANGEOVER TIME. All units engineered to allow complete roll change in shortest possible time.

LOW MAINTENANCE COST. All of the foregoing features, plus precision workmanship and up to the minute engineering, are a guarantee of low maintenance.

OPTIONAL FEATURES

BASE EXTENSION. Permits increasing the number of roll passes to meet future requirements, by the addition of standard housing units at a later date.

MOTOR DRIVEN COOLANT PUMP. Supplies flushing fluid to the rolls at each roll pass, and provides a rust preventative treatment to the formed strip. Tanks for fluid are built integral with the welded steel base.

ENGINEERS AND MANUFACTURERS OF
TUBE MILLS
USING
ECTRIC RESISTANCE WELD
OXY-ACETYLENE WELD
TOMIC HYDROGEN WELD

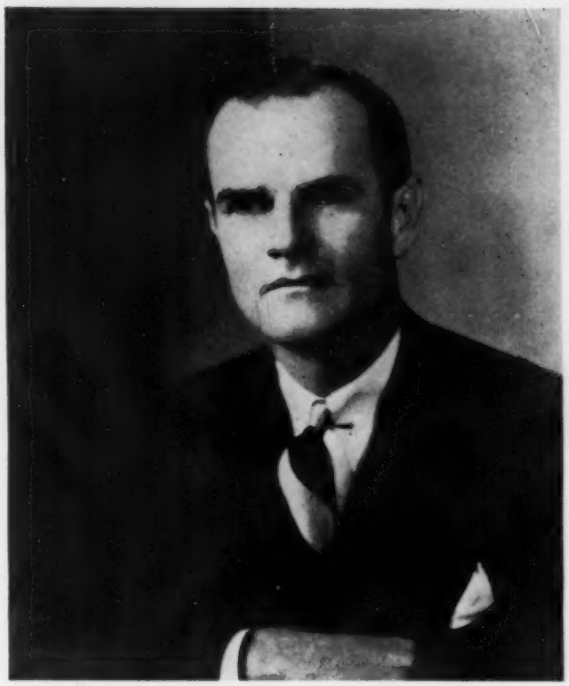
The McKAY MACHINE Company
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

McKAY

PERFORMANCE RUGGEDNESS PRECISION AND SAFETY.

The Iron Age

SALUTES



Gordon Street

He showed industry and community how they need each other . . . That dividends come from good will.

IN every generation there are a few men who give more than is asked of them. Such a man is Gordon Street. He could have accepted time honored tradition and become merely a successful industrialist; his talent is such he could have done it with a minimum of effort.

But this man's character goes deeper than that. He wanted to make his town, his county, his state, a better place to live and work. And he wanted it badly enough to do something about it. Thus, it was only natural that he should become the spearhead of a civic and public relations movement that was to help manufacturers to feel that they had a primary responsibility to their employees and the community—and thus to the state and nation.

He worked for harmony among all groups, led in urging closer cooperation between business and the community. Gradually, he sold the people of Chattanooga on the importance of manufacturing to their personal prosperity and welfare.

His company has had no cause to regret the hours he has given to civic work. In the 6 years since he's been president of The Wheland Co. their sales have multiplied approximately six times. Their new North Chattanooga plant will boost this growth even more dramatically.

In the Street family every Friday night is father and son night. They go to a movie of Jr.'s selection—usually a Western—or to some sports event. As often as he can make it, you'll find him at Baylor School practice or games.

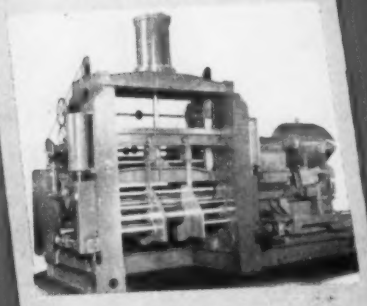
Other hobbies are golf (80's), amateur photography, and, of course, his business. When time permits, he gets a special kick out of taking his son on hunting and fishing trips. Oh, yes, he's been president of about everything there is to be president of in and around Chattanooga.

The WEAN ENGINEERING Company, Inc.

WARREN, OHIO

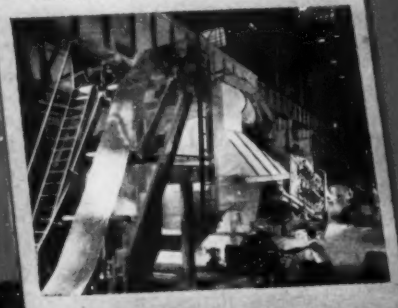
Continuous Strip Pickle Line

Processing Uncoiler



Continuous Electrolytic Cleaning Line

Continuous Hot-Dip Galvanizing Line



Associated Companies

WEAN EQUIPMENT CORPORATION
Cleveland, Ohio

WEAN MANUFACTURING CO.
Warren, Ohio

THE McKAY MACHINE COMPANY
Youngstown, Ohio

FLINN & DREFFEIN ENGINEERING COMPANY
Chicago, Illinois

THE HALLDEN MACHINE COMPANY
Thomaston, Connecticut

THE DREVER COMPANY
Philadelphia, Pennsylvania

THE WEAN ENGINEERING CO. OF CANADA, LTD.
Hamilton, Ontario

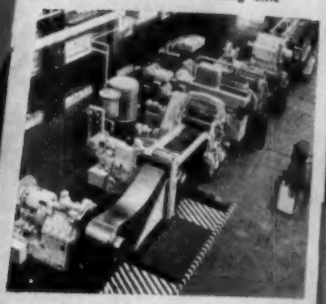
REPRESENTATIVES

England—
JOHN MILES & PARTNER
(London, Ltd.)
London, England

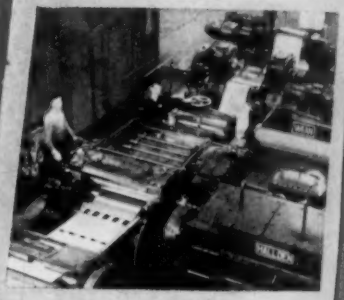
France—
P. DAMIRON & CO.
Paris, France

NORVIL COMPANY
Milan, Italy

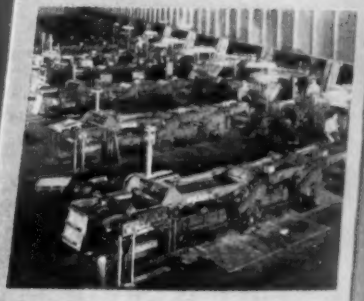
Continuous Coating Line



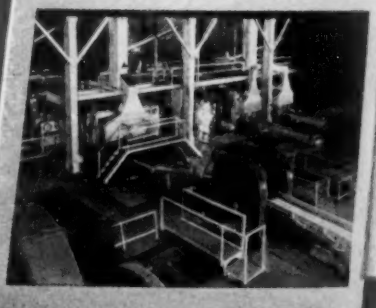
Tin Plate Shearing Line



Hot-Dip Tinning Units



Mechanized Sheet Mill



SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT

The Iron Age

INTRODUCES

Gus W. Wallin, elected to the newly created position of vice-president in charge of engineering of WEBSTER-CHICAGO CORP.

Thomas B. Hogan, appointed general superintendent of the McKees Rocks Chain Mfg. plant of the McKAY CO.

William Marks, elected a director of KAISER STEEL CORP. Mr. Marks is vice-president and sceretary of the company and has been on its legal staff for many years.

John B. Astell, elected chairman of the board of directors of JOHN B. ASTELL & CO., INC., New York. **H. L. Bialock** was named president; **Frank J. Heinzmann,** vice-president, and **Edward J. Mogol,** secretary.

J. C. Hydrick, appointed as works manager of DELTA-STAR ELECTRIC CO., division of H. K. Porter Co., Inc., Chicago.

Stephen Duda, appointed assistant to director of purchases of PITTSBURGH STEEL CO., Pittsburgh, and **James A. Callahan** was appointed purchasing agent for the Thomas Strip Division.

Alver E. Peterson, appointed comptroller of BRAINARD STEEL CO. with headquarters in Warren, Ohio.

Raymond L. Carey, joined TAYLOR-WILSON MFG. CO., Pittsburgh, as assistant chief engineer.

William A. Tinsler, Jr., joined the sales staff of the DEARBORN CHEMICAL CO., Chicago.

Mary Ellen Green, joined the staff of SUNDBERG-FERAR, Detroit.

William R. Miller, appointed manager of the metallurgical department of AMERICAN STEEL & WIRE CO., Cleveland, succeeding **James R. Thompson** who has retired after 50 years of service with the company. After nearly 40 years of service, **Frank E. Chesney** has retired as purchasing agent and director of the company. **John G. Nelson,** assistant secretary and assistant treasurer has also retired.

E. G. Staley Maxwell, appointed manager of the Charleston, W. Va., apparatus sales office for GENERAL ELECTRIC CO., and **John H. Pharis, Jr.,** has been named to Mr. Maxwell's former post as manager of the Roanoke, Va., office. **Richard T. Walsh,** appointed superintendent of the Chemical Division's Coshocton, Ohio, plant. **Neil Currie, Jr.,** general consultant for the company's manufacturing services division has retired.

W. L. Gustafson, named power industry sales manager west of the Mississippi river for MINNEAPOLIS-HONEYWELL REGULATOR CO. Mr. Gustafson's headquarters will be in San Francisco.

William J. McElroy, elected president of the west coast companies in Seattle and Portland, San Francisco and Los Angeles of ROUND ASSOCIATE CHAIN COMPANIES.

R. E. Metzger, appointed assistant to vice-president in charge of sales of COLORADO FUEL & IRON CORP. **Robert F. Bourne** has been appointed to assistant to general manager of sales, Claymont Stel Corp., Claymont, Del., subsidiary of CF&I. **Harry H. Stracy,** named manager of rolled product sales.

Turn Page

ROGER W. BERRETT, newly-appointed purchasing agent for American Steel & Wire Co., Cleveland.

GEORGE H. REITER, elected to the newly created office of executive vice-president of Universal Atlas Cement Co., New York.

DON S. SMITH, recently appointed vice-president in charge of production, of Wellman Bronze & Aluminum Co., Cleveland.

WHAT'S THE BEST WAY TO STRIP PAINT FROM METAL PARTS TOO LARGE TO BE SOAKED IN TANKS?

See Page 3

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What is the cheapest way to strip metal parts in large volume? *See page 9.*

What are the best ways to prepare stripped surfaces for repainting? *See page 11.*

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Harold A. Clough, named assistant sales manager of PARKER AIRCRAFT CO., Los Angeles.

R. H. Ringo, appointed resident comptroller of the new GENERAL MOTORS CORP. dual purpose plant at Arlington, Tex. **J. A. McNamara** and **H. D. Paustian** were appointed resident comptrollers of the Linden plant and Wilmington plant respectively.

George W. Ledbetter, appointed as West Coast representative of the Electro-Snap Div. of the EXHIBIT SUPPLY CO. and will be located at Sherman Oaks, Calif.

A. M. Kahn, elevated to chairman of the board of directors of CONSOLIDATED PRODUCTS CO., INC., New York.

L. W. Spang, appointed secretary of the M. A. HANNA CO., Cleveland.

Robert B. Haarde, named northeastern New Jersey sales representative for the residential, commercial and industrial boilers, radiators and heating accessories of the NATIONAL RADIATOR CO.

James P. Bacon, appointed manager of sales, tubing specialties division, for NATIONAL TUBE CO., Pittsburgh.

R. B. Blythe, appointed executive chief engineer of the Bryan factory of ARO EQUIPMENT CORP. **J. R. Markey** has been appointed sales manager of the aircraft division.

J. H. Grut, granted a one-year leave of absence as secretary and treasurer of NATIONAL AUTOMOTIVE FIBERS, INC., Detroit, and **Harvey B. Greene** will act as his replacement.

J. O. Eby, appointed Jeffrey Mine manager by JOHNS-MANVILLE CO., LTD., Asbestos, Quebec.

George Miller, appointed advertising director of CALORIC STOVE CORP., Philadelphia.

E. M. Slonaker, elcted vice-president in charge of sales of the WILLARD STORAGE BATTERY CO., Los Angeles.

J. Robert Simpson, III, becomes an associate of the J. R. SIMPSON & CO., Chicago.

ELWYN MERCER, named general manager of Allis-Chalmers tractor division operations in England.

JOSEPH H. HUMBERSTONE, recently elected a vice-president of Air Reduction Co., Inc., New York.

DR. A. LLOYD TAYLOR, appointed director of research, research laboratories of McDermid Western, Inc., Ferndale, Mich.

PAUL H. HILL, elected as vice-president in charge of sales for Nesco, Inc., Chicago.

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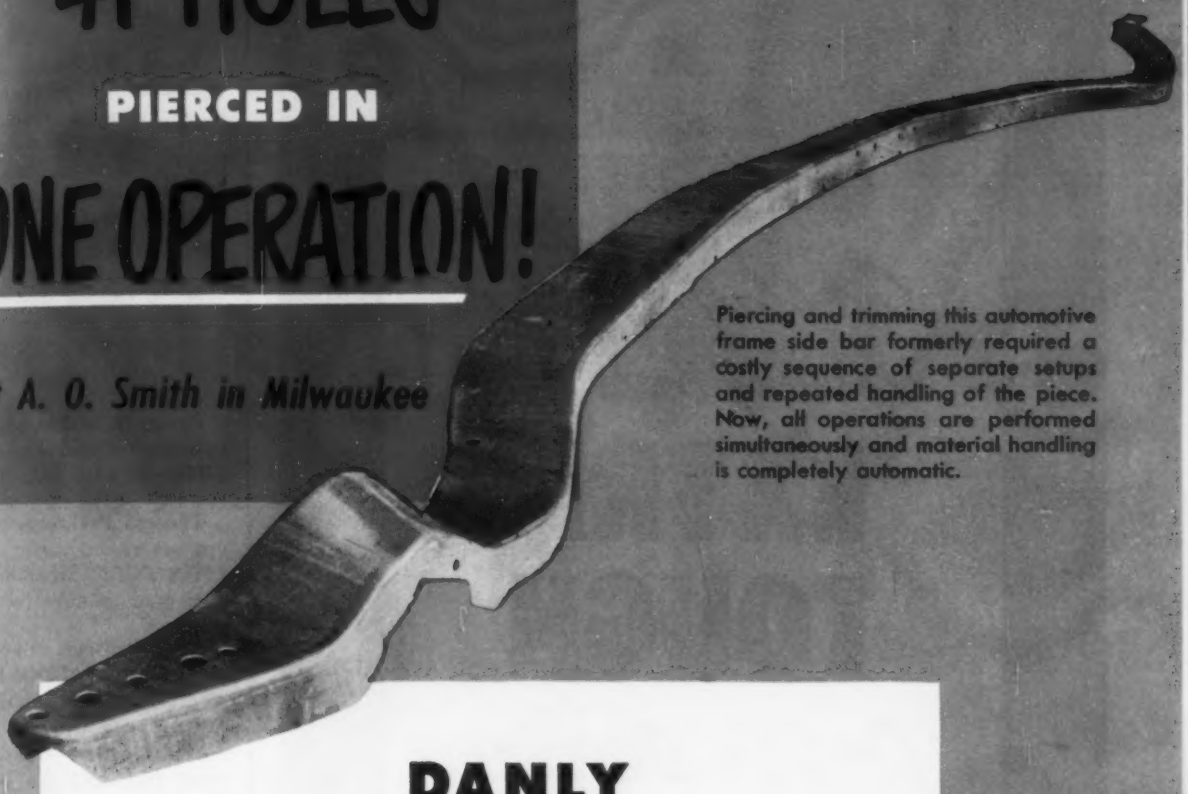

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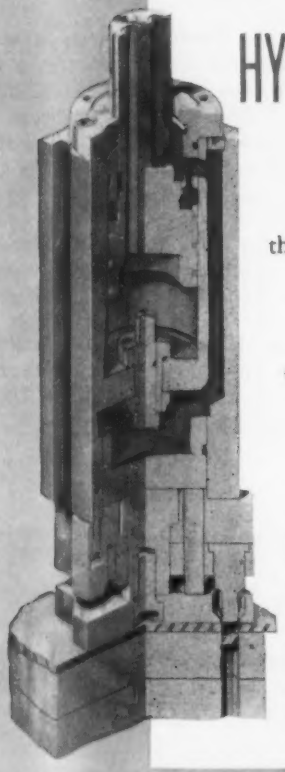

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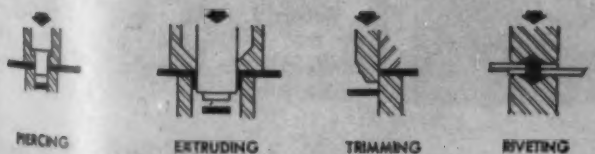

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Personnel

Continued

Frank W. Smith, retired as vice-president in charge of NORTON CO.'s Grinding Machine Div. operations, but will remain with the company as a consultant responsible for the company's machine division expansion. **Everett M. Hicks** will head the division.

H. S. Cooper and **G. F. Groff,** appointed as assistant comptrollers of CRUCIBLE STEEL CO. OF AMERICA, New York.

Byron D. Miller, appointed as steel industry relations manager for TOLEDO SCALE CO., Toledo.

Thomas Peterson, resigned as general sales manager of the BERYLLIUM CORP., Reading, Pa., the resignation to be effective Feb. 1.

E. R. Ordway, appointed as general manager of KAISER-FRAZER CORP. aircraft production on the West Coast. Mr. Ordway will be in charge of operations of the Oakland, Calif., Aircraft Div. and the Richmond, Calif., Machining Div.

H. H. Hanft, formerly a section manager of the transportation sales department, WESTINGHOUSE ELECTRIC CORP., Pittsburgh, has been promoted to the position of assistant to the manager of the firm's industrial department.

Chester H. Moore, appointed as chief engineer of the housewares division of NESCO, INC., Chicago.

E. A. Klippel, named general passenger traffic manager, with headquarters at Omaha, for the UNION PACIFIC RAILROAD.

OBITUARIES

George W. Davies, 62, an executive of the Sealed Power Corp., Muskegon, Mich., since 1933, recently at his home.

John Conway, production manager of the General Box Co., Corrugated division, Louisville, Ky., at the age of 56.

Alfred J. Cawse, Sr., general operating superintendent of the Prince Bay Plant of the S. S. White Dental Mfg. Co.

Robert J. Kehl, consulting engineer in the development department of Linde Air Products Co., at his home recently.

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Technical Articles

high hardenability steels FLASH-WELDED AUTOMATICALLY

by Jon Ruhlman and B. E. Nye
Cleveland Pneumatic Tool Co., Cleveland

Preset machines flash-butt weld landing gear tubing in 4130, 4140, 4340 and similar alloys, with only 2.1 pct failures in quality control test specimens. Weld areas range from 0.025 to 23 sq in. As much as 40 to 60 pct welding operation time is saved with this newer process. Tack welding, stress relieving are eliminated.

The flash-butt welding process[1] is commonly used in the automotive and other industries. Due to the high hardness and strength specifications of the chrome-nickel-molybdenum steel commonly used in aircraft components, the aircraft industry has been comparatively slow to accept flash welding. The region effected by the weld heat is likely to become brittle if precise controls are not exercised.

The flash-butt welding process is currently carefully controlled, however, and has been used by Cleveland Pneumatic Tool Co. for eight years in their aircraft landing gear. Today it is one of the best means of fabricating 4130, 4140, 4340, and other high-strength steels commonly used in such equipment. This has resulted from extensive research carried on to refine and improve the process and widen its applicability.

The Cleveland Pneumatic Tool Co. has, in the past eight years, incorporated over 100,000 production flash welds on aircraft landing-gear units. As a result of the extensive testing employed in the qualification of every flash-weld setup, there has never been a service failure of any of these welds reported. Neither is there knowledge of any such failure.

The sizes and shapes which have been welded vary widely. In general, the flash-welded members have been tubular. But for special applications, many different types and shapes of joints may be welded as long as suitable fixtures are designed for clamping the mating pieces in the welding machine. Rectangular, hexagonal, and "I" sections have been welded by this company.

This work has been done on three Taylor-Winfield flash-butt welding machines. These machines provide coverage of a broad welding range with adequate overlapping to prevent production tie-ups. Welds having a cross-sectional area of 0.025 to 2 sq in. may be produced on the 150-kva

machine. The 400-kva machine is ordinarily used to weld areas of 2 to 3 sq in. However, welds ranging from 0.500 to 4 sq in. may be made on this model.

Larger areas, from 2 to 23 sq in., are welded on the 800-kva welding machine. In special cases involving difficult shapes, this machine may be used for weld areas as low as 1 sq in. Now being ordered is a 1500 kva unit which is expected to handle areas up to 52 sq in. A listing of the tubing alloys and dimensions that have been flash-butt welded in the 800-kva machine is given in Table I.

The Lockheed P2V-2 landing gear trunnion, Fig. 1, incorporated an interesting application of flash welding. The trunnion was constructed of two half-shell stampings manually seam-welded together. The trunnion bearing forgings were then flash welded to the ends of these stampings to complete the trunnion. In all, the P2V-2 main gear employed 17 flash welds. The nose gear of the same airplane had 24 flash-welded joints.

Several design factors must be considered before work is set up in the welding machine. These factors are determined either from analytical calculations or from data taken from empirical curves plotted from test results. The most important among these design factors are detailed in the accompanying box.

With proper attention to these design factors, a high degree of control can be maintained in the flash-welding process. This is due to automatic operation of the equipment used (Fig. 3). Precision adjustment is provided for in regulating current magnitude, voltage, platen speed at

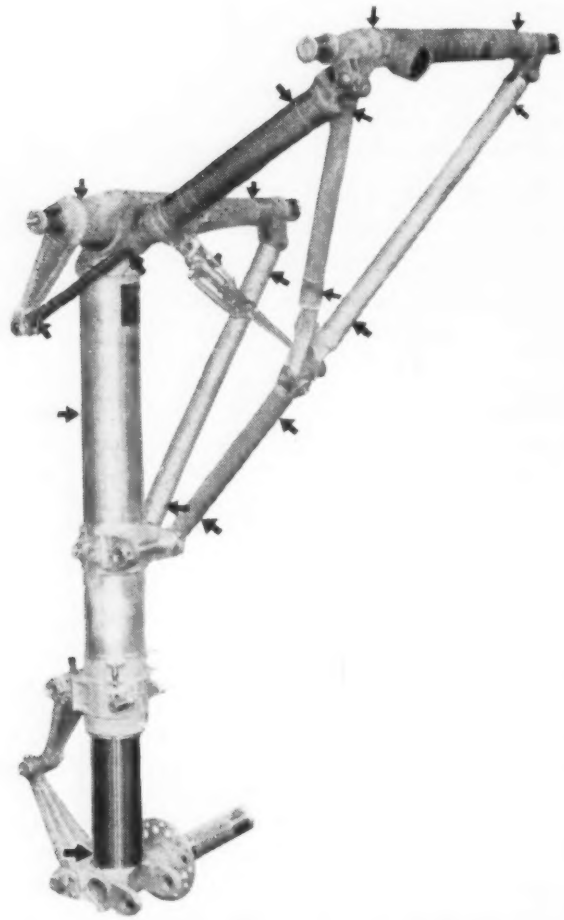

FIG. 1—This P2V-2 Lockheed landing gear assembly has 17 separate flash welds. Indicated by arrows in photo.

TABLE I

ALLOYS AND SIZES WELDED ON 800-KVA MODEL

Wall thickness, in.	Weld cross section area, sq in.	OD, in.	ID, in.	Steel
0.1515	1.410	3.115	2.812	NE8740
0.1875	2.908	5.125	4.750	4135 to 4140
0.1975	2.983	5.005	4.610	4340
0.201	1.336	2.317	1.915	4340
0.219	2.257	3.500	3.062	NE8740
0.219	2.257	3.500	3.062	4340
0.219	3.032	4.625	4.187	NE8740
0.221	1.499	2.375	1.938	4340
0.224	3.361	5.000	4.552	4140
0.250	2.896	3.937	3.437	4135 to 4140
0.250	2.550	3.500	3.000	4340
0.250	3.927	5.250	4.750	NE8740
0.255	5.612	7.260	6.750	4340
0.312	3.865	4.250	3.625	4140
0.3125	4.970	5.375	4.750	NE8740
0.328	2.241	2.500	1.843	4340
0.328	3.531	3.750	3.093	4135 to 4140
0.328	5.489	5.656	5.000	4135 to 4140
0.340	7.445	7.310	6.630	4340
0.344	3.138	3.250	2.562	4140
0.344	5.572	5.500	4.812	NE8737 to NE8740
0.364	9.052	8.280	7.552	4340
0.375	3.6815	3.500	2.750	A4135 to 4140
0.375	5.155	4.750	4.000	4340
0.3875	9.136	8.312	7.537	4140
0.406	4.586	4.000	3.187	NE8740
0.406	7.413	6.218	5.406	4140
0.407	4.268	3.750	2.935	4340
0.411	3.634	3.250	2.429	NE8739 to NE8740
0.4115	10.295	8.375	7.552	4340
0.426	5.793	4.750	3.897	4340
0.4375	4.553	3.750	2.875	4135 to 4140
0.4375	4.896	4.000	3.125	NE8740
0.4375	7.645	6.000	5.125	4140
0.440	3.020	2.625	1.745	4140
0.440	5.267	4.250	3.370	NE8739 to NE8740
0.4425	6.248	4.9375	4.052	4140 to A4135
0.453	3.799	3.062	2.156	NE8740
0.457	5.858	4.536	3.622	4140 to NE8739
0.465	11.460	8.310	7.380	4140
0.468	4.648	3.625	2.688	NE8740
0.4715	3.173	2.625	1.682	4140
0.500	4.221	3.187	2.188	NE8740
0.500	5.694	4.125	3.125	A4135 to 4140
0.500	6.676	4.750	3.750	NE8737 to NE8740
0.500	7.760	5.440	4.440	NE8740
0.500	11.192	7.625	6.625	NE8740
0.0502	4.337	3.250	2.245	NE8737 to NE8740
0.512	5.414	3.875	2.850	NE8737 to NE8740
0.516	8.889	6.000	4.968	NE8740
0.528	9.898	6.500	5.445	NE8737 to NE8740
0.531	6.933	4.687	3.625	NE8737 to NE8740
0.5315	6.208	4.250	3.187	NE8740
0.533	6.019	4.125	3.058	4135
0.536	9.550	6.218	5.145	4340
0.562	9.830	6.125	5.000	4340
0.573	14.290	8.520	7.375	4140
0.578	9.902	6.031	4.875	4140
0.578	5.362	3.531	2.375	4140
0.580	6.920	4.375	3.215	4340
0.592	8.690	5.250	4.062	4140
0.594	8.222	5.000	3.812	A4135 to 4140
0.602	10.918	6.375	5.171	4140
0.604	10.895	6.380	5.171	4140
0.617	6.418	3.920	2.687	4340
0.625	5.154	3.250	2.000	4140
0.625	13.745	7.625	6.375	NE8740
0.633	13.150	7.250	5.984	4340
0.635	6.627	3.957	2.687	4340
0.672	11.171	6.219	4.875	4140
0.678	6.989	3.957	2.605	4340
0.6875	10.124	5.375	4.000	4140
0.700	11.045	5.437	3.937	4340
0.719	9.670	5.000	3.562	4140
0.750	10.603	5.250	3.750	NE8740
0.750	11.045	5.437	3.937	4340
0.750	16.493	7.750	6.250	4140
0.783	11.774	5.567	4.000	4140
0.812	17.710	7.750	6.125	4340
1.000	11.781	4.750	2.750	4340
1.018	22.840	8.160	6.125	4340

DESIGN PRACTICE AFFECTING FLASH WELDING

1. Cross-sectional area of the member at the weld determines the capacity of the welding machine to be used.

2. The total loss of metal per piece due to welding includes the upset and flash, Fig. 2.

3. Regulation of current amperage and potential is determined by the cross-sectional area of the piece to be welded.

4. Sufficient area must be provided for the dies to grasp the parts[3]. This is necessary not only to insure rigid gripping, but to carry the electrical current necessary for welding.

5. Initial and final die openings are determined to allow for total travel and provide room for the flash loss at upset.

6. Total travel of the platens is computed as the travel required during manual and automatic flashing and upset.

7. The flashing or heating period must be sufficient to extend the plastic zone the correct distance back from the molten surfaces in order that proper upset may take place.

8. Since the time interval between upset and current cutoff is critical to prevent air-hardening, the proper number of post-heat cycles must be established and closely regulated.

any point in the cycle, travel distance during the flashing period and time at which the current is turned off with relation to the upset action.[3]

Machine settings checked for each run

In setting up a new job, the required settings and adjustments are determined. Then five or more sample welds are tested to destruction to qualify the original settings. In addition to these qualification specimens, additional test specimens are welded for each lot of flash-welded producton parts. These are welded at the same time as the production parts and must meet the requirements for qualification test specimens.

As an additional precaution, all production flash-welded structural units are proof-loaded, Fig. 4. Axially loaded members are tested in tension to 80 pct of the yield strength of the parent metal adjacent to the weld. If the member contains a weaker section, the test load is reduced to stress the critical section to 80 pct of its design yield strength. In no case is the proof test stress less than 70 pct of the ultimate design tensile stress at the weld.

Members subject to bending stress are proof-loaded in bending to produce a stress in the area adjacent to the weld equal to 80 pct of tensile yield strength.

The best measure of weld quality, efficiency and dependability is arrived at through continuous and extensive testing of welded specimens. These specimens are prepared by flash-welding sections of the same material and geometric design as the production part. The flash and upset of these specimens are machined down to a specified reinforcement thickness at the weld. Some of these specimens are tested in tension as full sections, but the majority are cut into test strips.

FIG. 2—Motion of the pieces to be joined is regulated during a preset heating of flashing period, after which the hot surfaces are forged together with a sudden impact. A short-time, post-heating current is then applied to retard cooling and partially relieve stresses.

They are subjected to tension, bending, or impact tests. A typical test report is shown in Fig. 5.

During the years 1946 and 1947, 2700 test strips were prepared and tested to destruction, Table II. The data secured were used to plot curves for use in simplifying the individual welding machine settings involved in the preliminary setup of any job. These empirical curves played a major role in eliminating the guess work in setup. A reliable weld was assured without undue expenditure of time and materials.

The deficiency most commonly detected in the test specimens which failed in the weld area was

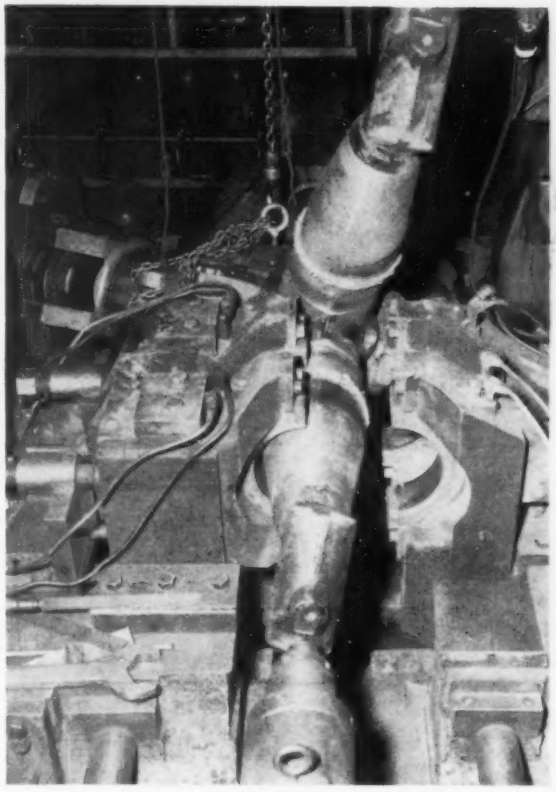

FIG. 3—Released by the dies that hold it rigidly in place during flash welding, this landing gear weldment is ready to be removed from the machine. Total loss of metal due to upset and flash must be closely controlled.

a profusion of small impurities in the weld cross-section. These showed up as light streaks or "penetrators" in the weld area. They were found to be the major cause of weld-test specimen failure when such failure occurred. The primary factor responsible for this type of defect has now been eliminated with the result that penetrators no longer present a serious problem.

More than a thousand tubular specimens were tested between Jan. 1, 1949 and Nov. 1, 1950. Of these, 464 tubes were tested as full sections. The balance of the tubes were cut into 6275 test strips, Table II. The over-all percentage of 97.92 pct fractures in the parent metal illustrate graphically the improvement accomplished in the flash-welding process. The average strength of the 2 pct which failed in the weld was found to be 98.5 pct of the specified minimum ultimate strength of the parent metal.

The upset and flash that is not machined off the inside of the tube strengthens the weld area considerably. In the past four years, 209 strips have been tested with the weld area machined flush on all sides. The entire 100 pct failed in the weld when subjected to tension tests. The extreme strength of the flash weld is illustrated by the fact that 89 of these specimens failed at 100 pct or more of the minimum specified heat-treat strength of the parent metal. Of the rest, 114 at 95 to 100 pct and 6 fractured between 89 and 95 pct. The vast majority of the welds failed at 95 pct or more of the heat-treated ultimate strength of the base metal.

As shown in Table II, test fractures in the weld plane on strip specimens have decreased from the original low figure of 8 pct to 2.1 pct.

The figure of 1 pct weld fractures in whole tube specimens, with those fractures averaging 95.2 pct, is also proof of consistant high quality. Local weld defects have a much more significant effect on strength of the narrow strip specimens than on the whole tubes.

The machined flash weld has a neat, high quality appearance. This is true whether it is machined flush with the surface (in which case, it is not discernable—see Fig. 6), or left as a reinforcing flange on the outside of the welded member. This feature would be of interest primarily as a selling point when used in the manufacture of civilian aircraft.

The advantages of the high strength of the flash-butt weld relative to the parent metal are manifested in a weight saving in the finished piece. This weight saving is accomplished by a

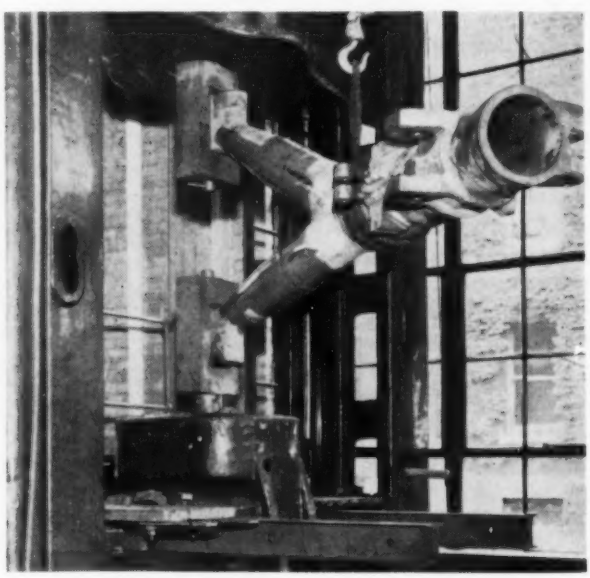

FIG. 4—All flash-welded structural units are proof-loaded. Normal proof test stress is 80 pct of material yield strength.

TABLE II

FLASH-BUTT WELD TEST RESULTS*

Year	No. of shipments tested	Geometry of specimens	Failure in parent metal, pct	Failure in weld area, pct	Average weld strength, pct
1946-47.....	2700	Strip	92	8	97.7
1949-50.....	6275	Strip	97.9	2.1	98.5
1949-50.....	464	Full section	99	1	95.2

* Based on those specimens which failed in the weld.
† Percentage of minimum specified heat-treat strength.

FIG. 5—Build-up of flash metal at the weld is machined flush on the outside, after which the joint is not discernible. In some components, parts of this metal is left as smoothly machined reinforcing flange.

reduction of about 60 pct in the wall build-up in the vicinity of the weld necessary in manual welding operation. At the same time, rough size of the piece is materially decreased, thereby reducing the amount of scrap produced in machining.

In addition, flash-butt welding has practically replaced all sleeved or socketed joints in landing gear construction. This, too, has resulted in a weight saving.

The Taylor-Winfield flash welders are precision machines of rugged construction. The pieces to be welded are held rigidly in the dies with a clamping arrangement. This permits vertical, horizontal, and lateral adjustment of the member with relation to the platen and the mating piece.

Before the welding current is turned on, the two members to be welded are firmly clamped, moved together and checked for concentricity

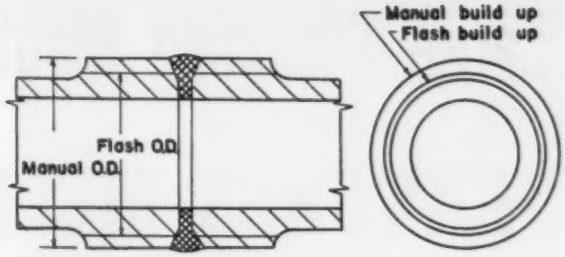

FIG. 6—High strength of the flash-butt weld makes possible a weight saving. This is due to a reduction of about 60 pct in the wall build-up necessary in manual welding.

and alignment. They remain in the desired position until the welding operation is completed. During the heating period and before upset, the mating faces are flashed off parallel.

The pieces are also adjusted and firmly held laterally, the burn-off and travel being predetermined. Due to this feature and the absence of warping due to the simultaneous heating and welding of the entire cross-sectional area, length tolerances may be held within 0.005 to 0.010 in. in the finished piece.

After the welding operation is completed, the pieces are immediately checked for proper alignment and run-out.

Perhaps the greatest advantage of automatic flash welding over manual methods is the major saving in man-hours. Exclusive of setup time, which is important only in jobs involving relatively few units, flash welding offers the fastest production time of any method available or under consideration. Two welds per minute is not exceptional for small parts, while 10 to 20 welds per hour can be expected on units of average size.[4] The welding time is somewhat extended in the case of more cumbrous and complicated assemblies.

Tack welding and stress relieving are eliminated in flash welding. The entire cross-section is heated and welded simultaneously and is normalized by the post-heating current. A small portion of the time saved by flash welding is lost in the proof tests which are performed on all production flash welds.

It has been found that from 40-60 pct of the welding operation time is ordinarily saved by converting from conventional welding methods to automatic flash welding.

Butt-welding, therefore, is useful primarily where machineability of one-piece construction presents a manufacturing impossibility. Also, it is practical where the saving in labor costs due to welding overbalances the weight-saving advantages of one-piece construction.

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[3] Smith, C. B., "The Application of Flash Welding in Airplane Construction," Journal of the American Welding Society, Vol. 22, No. 10, October, p. 769, 1943.
[4] Smith, C. B., "The Application of Flash Welding in Airplane Construction," Journal of the American Welding Society, Oct., p. 771, Vol. 22, No. 10, 1943.

Large Stamping Plant

FEATURES MECHANIZATION

by
George Elwers
Machinery Editor

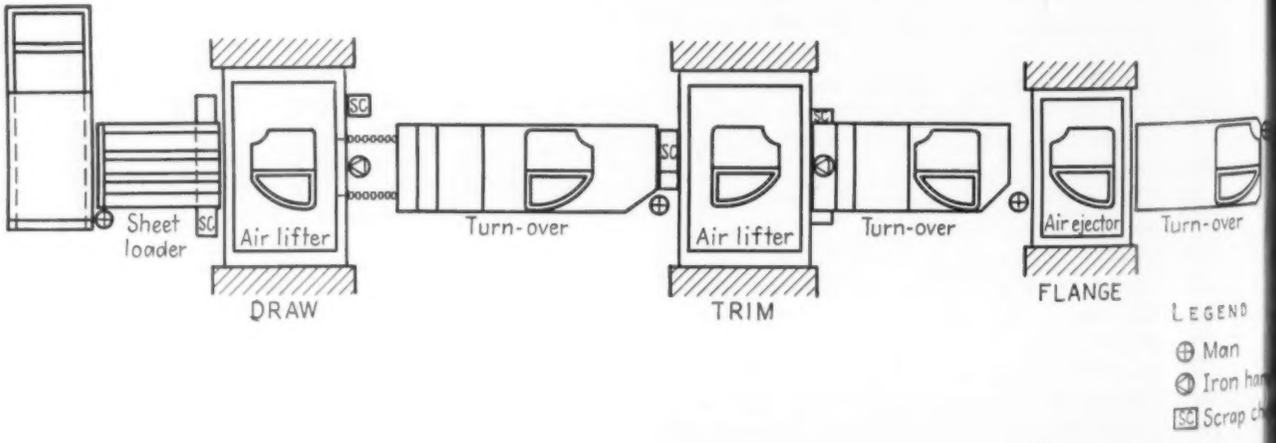
Maximum use is made of automatic loading, unloading, turnover, and other handling devices at Fisher Body's Hamilton plant. On continuous press lines for large door panels, for example, no operator has to lift, turn, or invert a panel. Much of the equipment is designed and built at Hamilton. Sheets are automatically sprayed.

One of the largest, most highly mechanized of stamping plants is the General Motors Fisher Body Div. plant at Hamilton, Ohio. Though this plant produces automotive body stampings of all sizes, probably its most impressive operations occur on the lines producing large body parts such as roofs, doors, and trunk lids. Even the massive equipment required for production of these large stampings is arranged for straight-line production flow, and full use is made of automatic press loaders, unloaders, automatic turnovers, and of conveyers between presses.

As an example of the degree of automation at Hamilton, as well as the size of the operations, the plant utilizes two large, 58 medium and 8 junior Iron Hand press unloading devices plus 15 medium size air-operated and 15 large mechanically-operated unloading arms designed and built by the plant's own engineers.

Typical of the production lines for large pieces is B line, which produces outer right-hand front and rear door panels. This line has five major presses, plus two small ones for piercing operations. Flow is straight-line, from sheet steel at one end to the conveyer carrying panels to assembly with the inner door section at the other. The drawing shows the layout of this line.

Sheets arrive at the press line stacked on flat trucks. Loaded trucks are lifted by crane or lift truck onto a platform which has room for two loaded trucks bringing the bottom of the stack of sheets up to press loading level. From this truck sheets are transferred manually to an automatic press loader. Materials flow is carefully arranged so that a full truck is always



brought up before the truck in use is emptied.

When empty, the truck is slid off the platform down an incline at the side of the platform. The full one then rolls down the platform guided by rails at sides of wheels to position vacated by the empty one. Exchange only takes a few seconds—seldom longer than two strokes of the press.

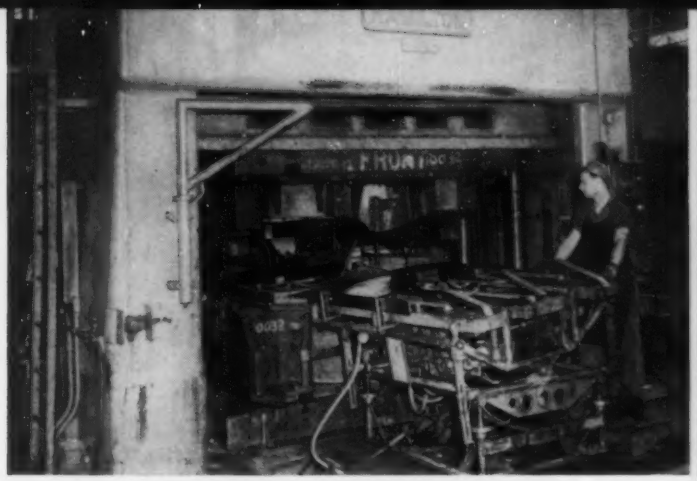
The automatic sheet loader is synchronized with the press, and is faster and safer than loading the press by hand. Sheets are automatically sprayed with lubricant by a gun synchronized with the press stroke. Operation is a draw, and utilizes a **triple-action, 740-ton press.**

A Fisher-designed unloader removes the part from the draw dies. An air-operated lifter loosens the panel from the lower die, then it is grasped at the edge of the sheet by the jaws of the unloader, pulled out, and allowed to drop into a turnover device. The unloader arm is actuated by a cam operated by the inner press slide. The jaws are air-operated.

Flips, lifts and positions panel

The turnover, also designed and built by the Hamilton plant personnel, flips the panel over and, as it does so, lifts it up and places it in position for the operator on the next press to handle with ease. Here it is pushed manually into a 450-ton crank press for trimming. This press is automatically unloaded by means of an air filter and an Iron Hand. This has brass jaws to avoid damage to the panel's finished surface. Again the panel is dropped into a turnover, turned, and placed in correct position for handling by the operator on the next press. This 265-ton press forms outside flanges and straightens the window opening in the door panel.

Unloading here does not utilize an Iron Hand because there is not room enough for the arm to swing, there being a small press in between this press and the next large one. Instead, a combination air lifter and air ejector is used, air cylinders pushing the panel out of the press after the lifter separates it from the lower die. The panel now drops into a tipup device which turns and then lifts panel to proper height. From here, the operator slides the panel onto the die



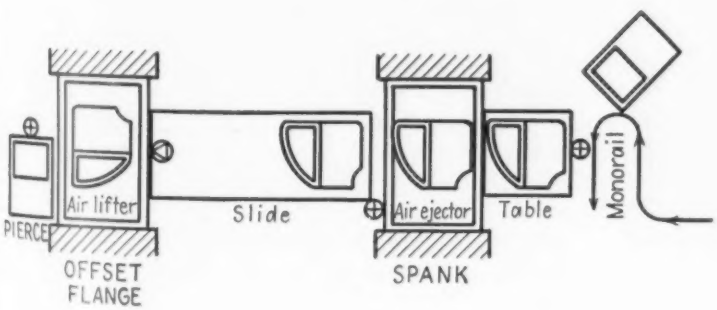
LOADING sheets into first press at head of B line. Automatic loading device pushes them into the dies. Loading truck removed for clear view.

where it has several holes pierced on a press located right in convenient position in the production line. Then the panel is loaded into a second 265-ton press.

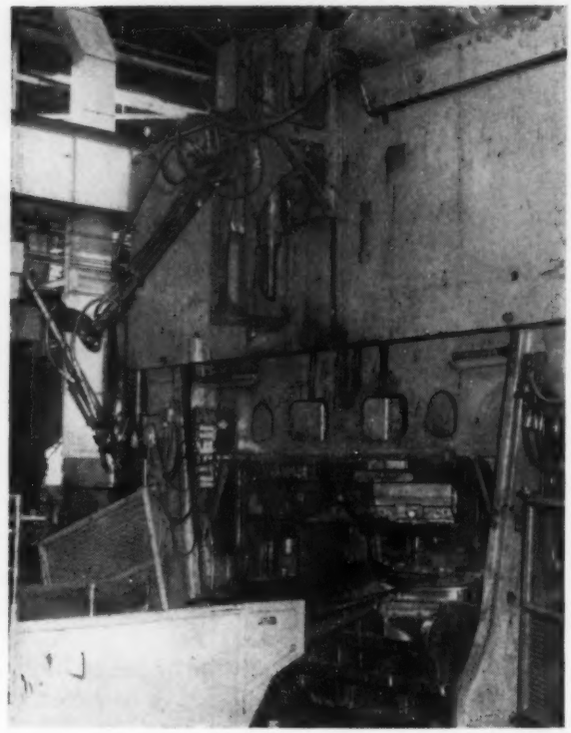
This operation offsets the window flange. Here an Iron Hand unloads the part automatically onto an inclined slide. This Iron Hand has rubber jaws to avoid marring the panel's finished surface. In moving down this slide, one corner of the door hits a pin. This causes the door to turn 90° as is slides by into proper position for loading into the next press. The final big press operation, termed a "spank," forms the window flange edges and bottom flange to the proper angle. A combination air lifter and air ejector is also used to unload panel from this press onto a table. From this table, panels are moved to a second small press for a final piercing operation, then hung on a Monorail conveyer for transporting to the assembly point.

Unloader pulls trunk lid from press

An interesting unloading operation is performed on another line. Here a trunk lid or top is removed from the initial draw press. Instead of being dragged out and dropped into a turnover device, the piece is inverted by swinging it like a pendulum by means of the unloader arm. The unloader pulls the piece out of the press rapidly so that the free edge of the top has enough



LAYOUT of B line, producing front and rear door panels at Fisher Body's Hamilton, Ohio, plant. Note scrap chutes.



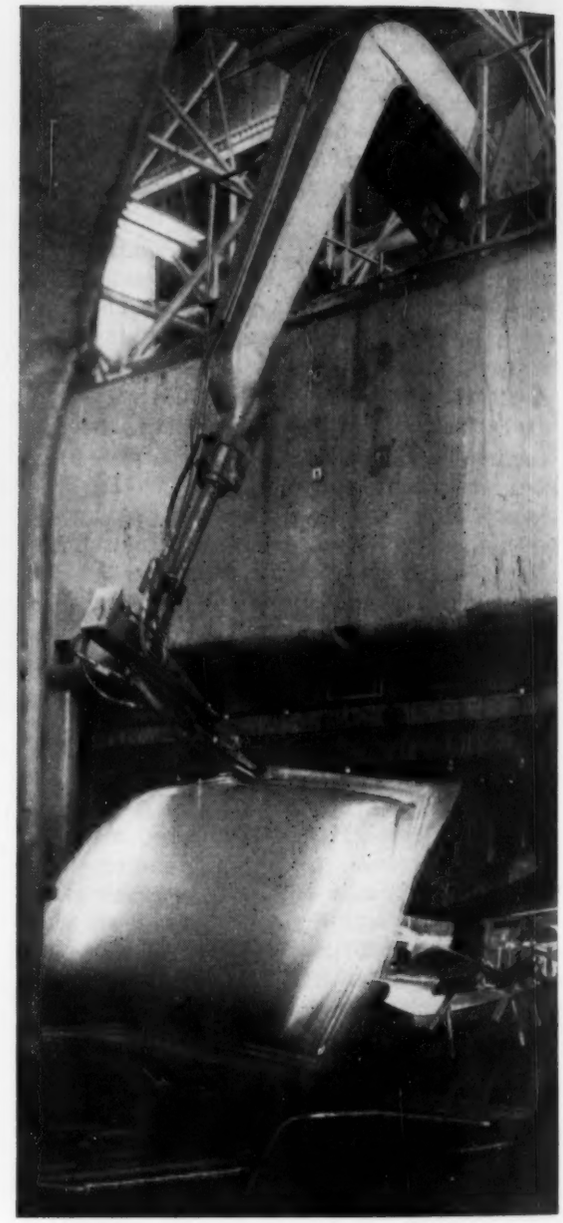
IRON HAND dropping door panel into turnover device, after pulling it from second press in Hamilton's B line.

momentum to swing down past the jaws and up in an arc away from the press. Jaw actuation is timed to release the piece after it starts the upswing so that it completes its flip and lands on the conveyer inverted from its original position in the dies, the free edge having described a 180° arc under the unloader jaws.

It is of interest to note that the turnover devices in use on these lines depart somewhat from the usual type which are normally tripped by a complicated system of electric eyes and switches. These turnovers are controlled by switches mounted directly on the press slides. There are no electric eyes to get out of order and synchronization with press operation is, of course, perfect.

The 740 ton first operation draw press with its automatic sheet loader and Iron Hand runs practically continuously, its speed being set to that which the rest of the line can handle. The work of the other seven men is so divided that all have an equal amount of work to do, thus the whole line works in a rhythm which is seldom broken and promotes a continuously operated line. Controls on presses are interlocked so that there is never a panel being unloaded onto another one. Continuous operation obviously pays benefits in production and also reduces maintenance since repeated stops and starts promote wear on all parts and the getting out of adjustment of brake and clutch.

Continuous operation has been promoted by careful attention to making as many operations



MECHANICAL unloader, with air-operated jaws, swinging top stamping like a pendulum, to invert it, after it has been pulled from dies of first-operation press. This type of unloader was designed by Fisher-Hamilton engineers, is identical with one used on B line.

as possible automatic, and to making each operator's job as simple, and safe, as possible. At each loading station the conveyer delivers the panel at exactly the proper height and in proper position for loading. Nowhere does an operator have to lift, invert or turn a panel, except in sliding on and off the last piercing press. No operator at any time has to handle any scrap, slugs, or offal, as these are shed from dies into chutes that run to press pit where the offal is automatically separated from scrap.

These same principles of maximum automation are used throughout the Fisher Body Hamilton plant, and many innovations pioneered there have spread to other Fisher Body plants.

Coolant filters extend tool life

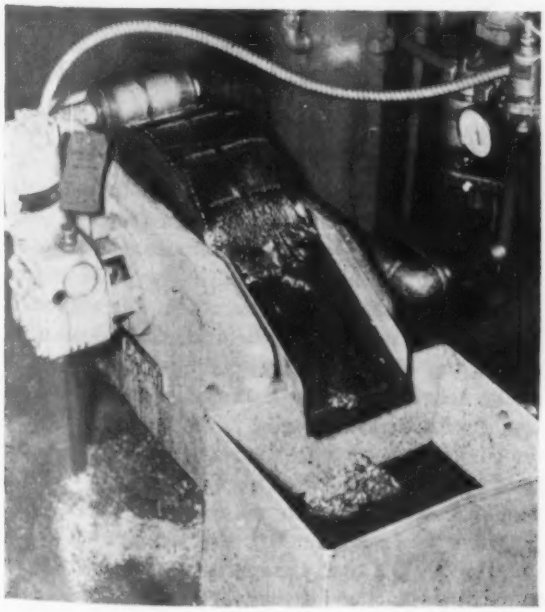
Minute metal particles too small to settle out of agitated cutting oil are removed by magnetic separators at Warner Gear Div., Borg-Warner Corp., Muncie, Ind. Where necessary to remove small metal particles and minute pieces of grinding wheels too small to be removed by other methods, a paper filter is used.

In production of automatic transmissions, small pieces of metal are particularly hazardous to valves. Throughout production and assembly operations, precautions must be taken to keep the assembly free of dirt and metal particles. The methods employed have been highly effective in removing both metal and grit from the transmission assembly.

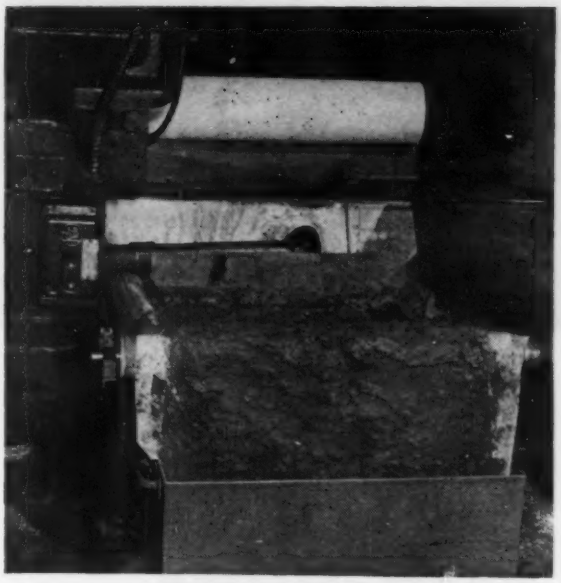
In addition to removing metal particles and grit, Warner Gear has been able to increase tool life, particularly expensive broaches, gear shavers and hobs. Surface finish has been improved. Clogging of oil pumps has been reduced and useable life of cutting oil has been effectively increased.

Where Delpark paper filters are employed on centerless grinders, coolant is now changed monthly instead of several times a week. Barnesdril magnetic separators are used for turning, broaching and shaving operations. The method may be employed for other metal cutting operations, including shapers. Frequency of coolant changes has also been reduced since magnetic separators have been installed.

In the Barnesdril magnetic coolant separator the used coolant flows into the separator directly from the machine. Flow is restricted to an area between the separator housing and a cylindrical drum carrying a number of Alnico magnets. The drum rotates in the opposite direction to the coolant flow.



ALNICO MAGNETS on cylindrical drum separate metal particles from coolant in the Barnesdril separator.



GRIT AND SMALL metal particles are efficiently removed from coolant with the Delpark filter separator. Sludge is carried out of separator to disposal can.

Metal particles are drawn out of the coolant by the magnetic field to the drum shell where they are held until they are scraped off and deposited in a removable container. After passing through the restricted area, the clean coolant flows back into the machine.

With the Delpark system, filters ranging from paper to unwoven rayon are selected to meet specific conditions. All of the coolant passes through the filtering material where abrasives are trapped.

Filtering material is fed from a roll as required. When the filtering surface reaches its capacity, the endless chain conveyer automatically moves forward, presenting a new filtering surface to the coolant.

The filtering material, carrying sludge from the coolant, moves up a ramp, allowing any retained coolant to drain back into the system. At the end of the ramp, chips, sludge and other solid material are separated from the filter and dumped into a waste box. The used filter material rolls up automatically for easy disposal.

The amount of metal and grinding wheel particles removed by these methods depends on the type of operation, shape and size of the chip and other factors. In each operation, the volume of metal and grit removed is significant.

FINE-GRAINED PHOTO on aluminum base has hard, scratch-resistant surface—is ideal for nameplates and maps.

PHOTOS ON ALUMINUM resist heat and scratching

By Eugene Wainer
Director of Research
Horizons, Inc.
Cleveland

Pictures, nameplates and drawings reproduced photographically on aluminum have a hard, scratch-resistant, glass-like surface. The image is substantially grainless and halftones may be faithfully reproduced. The method uses photographic and anodic processes. Use of dyes gives many rich color effects.

Photographs on an aluminum base are commercially possible with a recently developed Swiss method. Such reproductions have unusual physical properties and have advantages for a large number of applications.

The Aluphoto plate is a photosensitive anodized aluminum sheet on which the photographic image is developed in the anodized layer. After sensitization and exposure in the standard darkroom printer, the image is developed using standard developing and fixing chemicals. The finished plate offers a substantially grainless image, a high degree of resolution, and continuous tone. The plates are not affected by nuclear radiations.

The process is based on deposition of a silver compound in the pores of a fibrous compound of aluminum. This is formed on the metal surface by electrolysis or chemical treatments. The possibilities in use of such a surface for photographic purposes were first investigated in the early '30's.

Sensitized plates stable

The plate containing photosensitive material in the unsensitized condition can be stocked for years. The process was developed by Dr. M. Schenk of Basel, Switzerland.

Primary difference between this and an earlier Seo-Photo process is that sensitization may be made easily by the user. In the sensitized condition, the plates are stable for 2 to 3 months. The plate is permanently stable after the image is formed.

The plates, sensitized and exposed by the user, may be shipped and handled freely in the non-sensitized state. Once sensitized, exposed, and developed, the plate surface may be heat sealed and becomes hard and glass-like. The surface may be wheel buffed to a high gloss.

Plates are of two types: Type A is transparent and colorless; Type B is opaque and pearl gray. Negative or positive finishes may be used. While the standard plate is the bright transparent glass type, half dull or dull surfaces may be obtained.

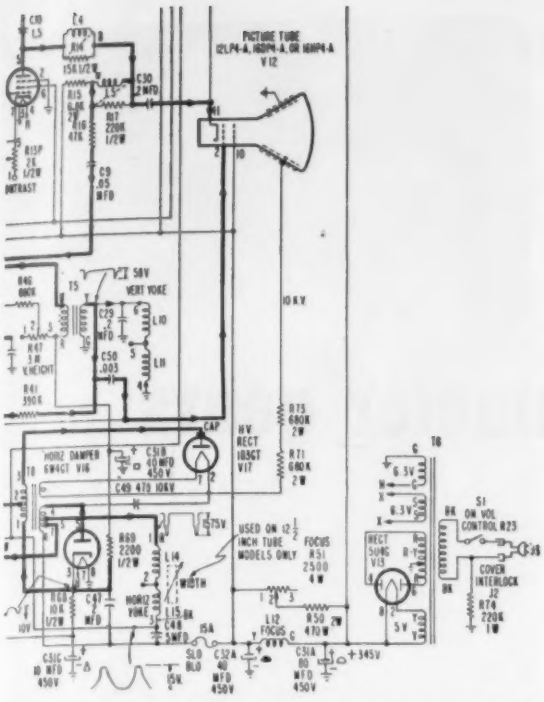
The anodized layer has an average thickness of 0.01 to 0.015 mm. Properly prepared, the photographic surface is well keyed into the base metal. It is highly resistant to scratching, weather, salt air, salt water corrosion, and is unaffected by contact with cold or hot foodstuffs, organic oils and solvents, and organic acids. The plates may be prepared in finished form by the amateur photographer.

Resists destruction

Simplicity of handling and resistance to destruction or deterioration under a variety of conditions make the process attractive. It is heat resistant up to at least 600°C. The plate may be heated up to the melting point of the aluminum base without affecting the image. If done carefully, the aluminum may be melted completely away leaving an image carried substantially in a film of aluminum oxide. The hard surface may be easily cleaned with soap and water and sterilized by normal clinical procedures.

The lack of grain in the image permits reproduction to degrees of detail equal to at least 40 microinches. Faithful repetition of half tones in normal gradation is possible and landscapes and portraits may be readily duplicated.

Against these advantages are some disadvan-



DIAGRAMS AND BLUEPRINTS reproduced photographically on aluminum resist heat, salt water, organic oils, acids.

tages. The plate is expensive although continued research will probably reduce costs. Pure whites are difficult to obtain. "White" plates are more on the gray side and the high degree of contrast needed for portraiture is not available.

Darkroom sensitization makes darkroom procedure lengthy, though on large runs processing can be mechanized.

The plates are slow, having an ASA speed of about 0.1. Thick plates cannot be bent without cracking the anodized layer. Thin plates can be flexed considerably before cracking develops. The plates are not resistant to strong alkalies.

Anodizing involves insertion of a sheet of aluminum in an electrolytic bath in which the aluminum is the anode. By controlling bath composition, temperature, voltage and current, an oxide layer is formed on the surface of the aluminum. The character and thickness of the deposit can be controlled. In this condition, the anodic film is porous, highly absorbent, and easily scratched.

To prevent rapid destruction of the image the plate must be heat sealed. The plate is boiled in solutions of salts which either hydrolyze themselves to form hard insoluble compounds in the pores, or in the type of salt which reacts with the aluminum oxide layer to give hydrolyzable salt.

Plates are received in the non-sensitized condition, are stable indefinitely and may be handled without special precaution. Sensitization and photographic processing are completed in the darkroom under red light without special precautions.

Three baths are used for sensitization and three additional baths for developing, fixing and toning. The various chemicals are supplied ready-mixed and are dissolved as received in measured amounts of distilled water. Preparation of the developer requires care as it contains an anti-fogging agent which requires separate solution and subsequent acidification. One of the sensitization baths and the developer decompose slowly. The other baths may be used to exhaustion.

The usual darkroom type of containers are suitable for sensitizing. The sensitizing baths are somewhat corrosive and for commercial work tanks should be acid resistant. Plates are dipped in the sensitizing baths, rinsed and dried.

From this point on, the plates are sensitive to light and must be treated like any other plate.

Image may be toned

Owing to their slow speed, the plates should be treated like a slow bromide printing paper. Exposure times generally vary from 30 to 120 sec.

Exposed plates are dipped in water, then developed until the image, which will appear brown rather than black, comes up in a distinct dark tone. Plates are then rinsed. Fixing requires about 2 min.

At this stage the image is brown. If deep blacks are desired, the image may be heavily toned in gold, platinum or palladium for 10 to 15 min after fixing and rinsing. Under-exposure usually produces blue tones and for certain subjects these are often more attractive than deep black. To obtain special effects most of the acid toning techniques normally employed for photographic plates may be used.

A final sealing step is required to give the plate its characteristic abrasion and corrosion resistance. The simplest method is to boil in distilled water for 20 to 30 min. Better mechanical properties are obtained by boiling in a 20 pct solution of Glauber's salt. High resistance to salt water corrosion may be obtained by boiling in a solution of nickel acetate, cobalt acetate and boric acid. Marked increase in resistance to abrasion can be achieved after one of the above heat sealing steps by heating the plate in a ½ pct solution of ordinary hand soap.

Plates may now be rubbed dry with a soft cotton cloth until a smooth finish is obtained. Alternately a buffing wheel may be used with, for best results, addition of a 600°F abrasive such as alumina to the cotton.

Optical density not affected

The developing and toning process is subject to the variations common for the ordinary silver halide emulsion plate. Further special effects such as brightly colored backgrounds may be obtained by treating the aluminum oxide layer with inorganic and organic chemicals.

The sealing process is subject to modification. Where dyes are used, dyeing takes place after development and fixing while the plates are still wet. Since the dyes which are most attractive are normally transparent, they have little effect on the optical density of the silver image.

HUGE MACHINE SHAVES 200-in. diameter gears

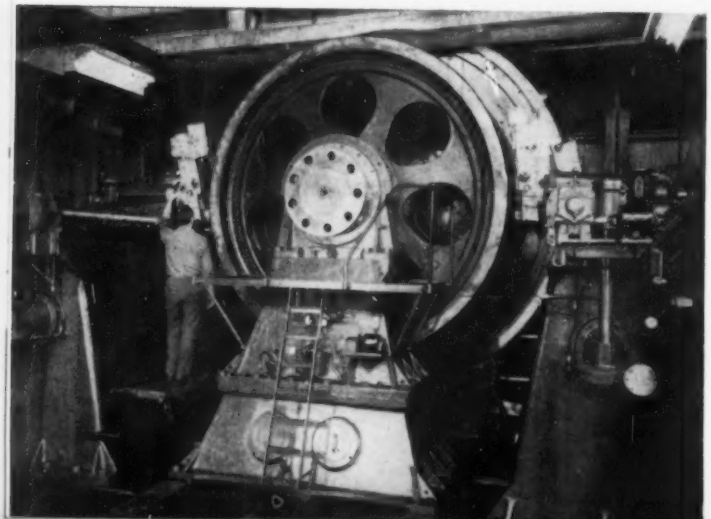
P. J. Wenz
Superintendent, South Plant, and
Harry Engvall
Chief Engineer, Turbine & Gear Dept.,
De Laval Steam Turbine Co.
East Trenton, N. J.

Gears up to 200 in. in diameter and 60-in. face width are shaved in regular production by De Laval Steam Turbine Co. Accumulated error in tooth spacing on gears with over 600 teeth is only a few tenths. A standard gear shaver has been modified to handle these big gears.

Gear shaving, once associated mainly with production of quiet gears for automotive transmissions, is now being used as a regular step in the production sequence on large gears. Gears up to 200 in. in diameter and 60 in. in face width are shaved by De Laval Steam Turbine Co.

Most of the large gears produced by De Laval are used in turbine-driven marine propulsion drives. They must be built to the utmost accuracy in order to reduce noise and vibration and assure maximum gear life. Equipment and processes are, therefore, selected to eliminate the possibility of human errors affecting the product as far as possible.

FIG. 1—Standard gear shaver, normally not used for gears larger than 4 ft in diameter, as used by De Laval for gears up to 200 in. in diameter, up to 60-in. face.



In the past, De Laval's practice was to finish all gears by lapping. In the case of marine reduction gears, some of the smaller gears are still being finished in this manner. But with the installation of additional gear shaving equipment all such gears will be finished by shaving, it having been found that better finish and higher accuracy is consistently obtained with this process.

Production of extremely large gears of this type obviously requires a certain amount of custom building of machines right within the De Laval plant.

Typical is the dual hobber shown in Figs. 1 and 2, used by De Laval for simultaneous hobbing of both right hand and left hand teeth of large herringbone gears. The machine, despite its size, is so accurate that the total accumulated error in tooth spacing on a single gear with upwards of 600 teeth generally does not exceed a few ten-thousandths of an inch.

Hobbing time is measured in days rather than minutes. For a 648-tooth, 140-in. diam gear with 37-in. face width, 4.63 D.P., total hobbing time may amount to three weeks for outline, roughing and finishing cuts. No change in hobs either for sharpening or re-setting is permitted during the roughing or finishing cut.

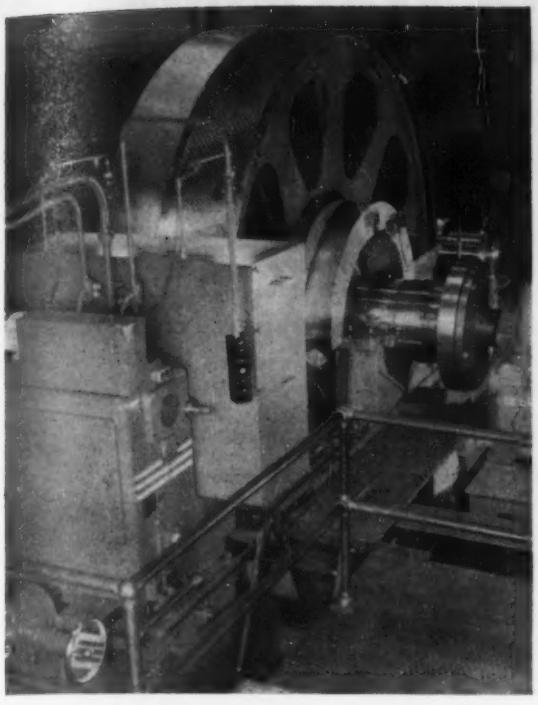


Fig. 2—Another view of De Laval's gear shaver. Gears are mounted separate from machine, in zero-clearance bearings. Two hobs cut simultaneously to make herringbone.

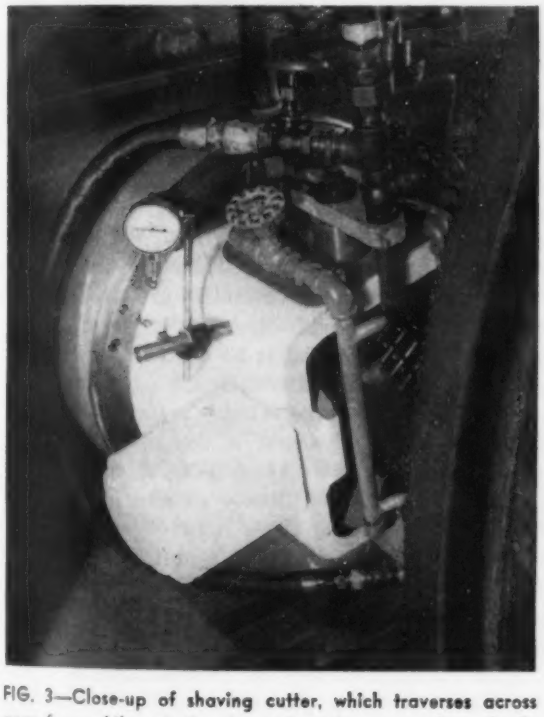


FIG. 3—Close-up of shaving cutter, which traverses across gear face while rotating in mesh with gear and gradually feeding in until gear is finished.

Many of these gears are cut with single thread Michigan ground-form Class A pre-shave type hobs. Cutting is continuous, around the clock. To insure accuracy movable partitions enclose the hobbing machine during the cut in order to permit maintenance of constant temperature conditions regulated by a sensitive temperature control unit.

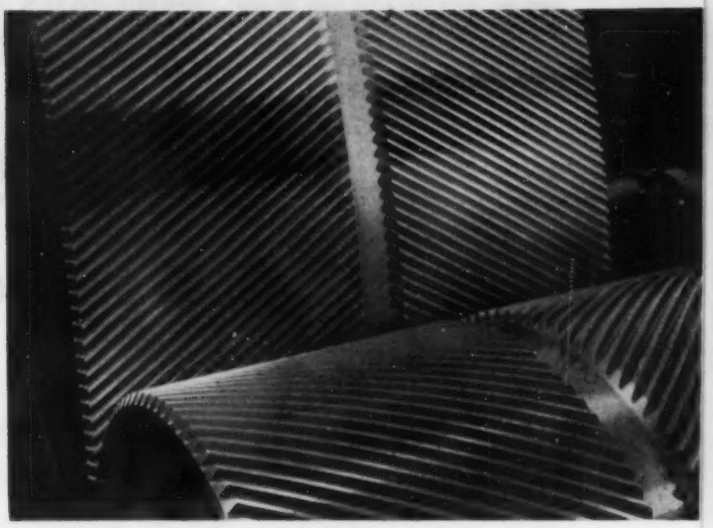


FIG. 4—Gears are inspected by checking contact with actual pinion with which gear will mesh. Since shaving produces accurate form, only contact along tooth need be checked. Lines on teeth show contact with blued gear.

A small amount of stock, 0.003 to 0.005 in. per tooth, is left for final shaving. Due to the face width of the gear, transverse shaving is used. Fig. 3 shows the cutter reciprocating across the face of the gear being finished, while the two rotate in mesh. The machine basically is a Michigan shaving machine normally used for gears up to 4 ft in diam., with separate drive to the gear, which in turn drives the cutter. To prevent possibility of lateral movement of the gear during shaving and to take out any backlash in the setup, a bronze shoe bears on the gear shaft.

Check with pinion made in machine

As in hobbing, shaving is continuous until finish and tooth contact with the mating pinion is satisfactory. Checking for contact is done without removing the gear from the shaving machine. The mating pinion is mounted in bearing pedestals and is periodically moved into mesh with the gear. A close-up of the checking operation is shown in Fig. 4. Contact is shown by the dark stripe across the gear. The pinion has already rotated past this stripe and the contact line on each pinion tooth is visible.

With this process, dead-true running gear sets are obtained at De Laval. At the present time both pinions and gears are shaved on the same machine. However, a second Michigan shaver is being installed at De Laval to permit shaving all high speed gears in a similar manner.

ELECTRIC FURNACE MELTERS make imaginary heat using NPA practice

Ninth Annual Conference attendance broke all records . . . Making of —0.03C stainless well standardized . . . Melters don't like boron steels . . . rare earths, Lan-Cer-Amp and Mischmetal very popular.

Conservation of raw materials special electric furnace practice. Stainless steel making, protests against boron, and an imaginary heat made from #1 bundles of M80 forms were featured last week in Pittsburgh at the AIME, Electric Furnace Annual Meeting. The Ninth Annual Meeting was well attended and included a special educational session held on Saturday.

The availability and conservation of raw materials technical session was led by T. J. McLoughlin, U. S. Steel Co. Fred R. Franklin, NPA, Washington, D. C., told the group that NPA allocations of alloys is essentially a legal procedure and that the proper forms and channels must be used to obtain the needed materials. Half of our nickel goes into steels and the average monthly consumption of nickel has been reduced almost 25 pct in 1951 compared to 1950.

Jets take lion's share

With more nickel going to our allies, even tighter restrictions on nickel may occur. Mr. Franklin summed up the present supply and demand of each of the alloys. The jet program and tool steels are taking all the cobalt with no hope of increased domestic production of this metal. Present requirements are at least twice present supplies not counting the unknown quantity in stockpile.

Tool steels ordinarily use ⅔ of all our tungsten. In 1950 the tungsten used in 18-4-1 high speed steel was reduced 20 pct. This year the total requirements for high speed steel will only amount to 6 pct of tungsten supplies. By mid 1952 the group was told we will be in better balance on supplies and use of this vital metal.

Supplies of molybdenum are slowly increasing although the metal is still in short supply. About 40 pct of domestic molybdenum production is still being made available as a byproduct of copper production.

Selenium will soon be put on allocation the meeting was told. New sources of chromium will be available by spring, supplies of vanadium balance demand and silicon is not critical.

Costs of manganese ore have gone up 50 pct, f.o.b. foreign ports, while the prices of ferromanganese have not followed. Mr. Franklin believes the ferromanganese makers will soon have to be granted some relief by OPS in this regard, which was solemnly seconded by the ferromanganese men present.

5-point scrap program suggested

Mr. Edward Soloman, Max Soloman Co., Pgh., fittingly attired all in black brought the group up to date on the scrap situation. He told the steel melters that we are faced with the greatest scrap shortage in history. He cited the impossibility of securing specially prepared scrap particularly for acid steel making when the price for such material is no better than regular grades. Mr. Soloman strongly recommended united action to correct today's scrap shortage. Specifically he advanced a five-point program which should help: (1) Ask OPS to increase prices of specialized items making sure that they limit the use of these items to shops which need this type of scrap. (2) Contact metal users for prompt return of segregated scrap. (3) Mills might do their own cutting or preparation. (4) See that NPA understands each need so that proper NPA allocation can be intelligently done. (5) Keep after your particular dealer and broker.

Gilbert Solar, U. S. Steel Co., delivered his paper at this same session, "Effective Use of Available Materials and Facilities." He pointed out the possibilities of substituting nitrogen and manganese in stainless grades for nickel. Up to about 40 pct of the nickel content can thus be replaced.

Mr. Solar said that the use of metallic oxides to replace ferroalloy additions should be studied

closer to determine which method of alloying produces better yields of the metals in short supply. Silicon carbide replacement for aluminum as a deoxidizer in semi-killed and rimmed steel was recalled. Exothermic ferroalloys will find wider use he predicted. The new chromium pellets, Simplex containing 5 pct Si, as a substitute for low-carbon ferrochromium can be used in magnesite bottom furnaces instead of relying in pick up of chromium from chromite hearths.

The "Sponge Iron" session brought out some interesting comparisons between American and Swedish furnace practice. C. A. Scharschu, Allegheny Ludlum, and D. J. Girardi, Timken Roller Bearing Co., each delivered excellent papers. Chief advantage of the Hoganus and Weidberg processes in Sweden is low sulfur and lower priced iron because of lack of cheap scrap.

Although the use of sponge iron charging material is on the increase in Sweden the consensus was that the practice is not yet economical in this country. Based on costs of Swedish operations Gilbert Solar figured out loud during the discussion that the sponge iron amounted to $46.00 per ton which is about equal to our ceiling scrap price when we have any.

Don't like to make boron steels

Generally the electric furnace melters making steel castings don't like boron. In fact they like even less the pressures put on them to use boron as a substitute for other alloys. The only point in general agreement after Thursday's "Boron in Electric Furnace Melting" was over, was that no boron is picked up from melting boron containing scrap.

Dr. McBride Metallurgical Advisory Board, ably defended boron in the discussion. He cited International Harvester Co. which is presently specifying boron alloys in about 60 pct of all their alloy steel applications. The no-like-boron casting makers muffed the rebuttal by not recalling that all Harvesters' boron steels are wrought steels used in the quenched and drawn condition.

CaC_2 used to desulfurize

Interest was quickly revived, however, when the desulfurization was brought up by G. Derge, Carnegie Institute of Technology. Sam F. Carter, American Cast Iron Pipe Co., followed with a presentation of the "Use of CaC_2 Additions In Both Acid and Basic Furnaces." Using argon, nitrogen and carbon dioxide gases to blow CaC_2 into the bath reduced sulfurs fast. Carbon dioxide was recommended over the other gases as it is cheaper and does not present nitrogen contamination possibilities.

The last paper by Etienne Spire, L'Air Liquide, Montreal, Canada, pointed up the advantages of sulfur removal in the ladle by bubbling argon gas thru the molten metal.

Friday's session on stainless steel production featured chromite hearths, —0.03C stainless, rare earths and titanium alloys in stainless. A. F. Feild, Armco Steel Corp., J. E. Herrod, U. S. Steel Co., and J. J. Green, Universal Cyclops Steel, cited their experiences with chromite bottoms. Better life with chromite hearths plus chromium pickup for alloying are nicely combined by this practice.

The next paper by Walter Crafts, Electro-Metallurgical Div. of Union Carbide and Carbon Corp., was a masterful job well documented and calculated to increase the tonnage of low carbon unstabilized stainless. Messrs. R. Shaw, Allegheny Ludlum Corp., J. E. Herrod, U. S. Steel Corp., and J. H. Kennedy, Republic Steel Corp., added their experiences on producing such steel.

Chromite hearths can take it

It was concluded that a 1.5 lime-silicon ratio is optimum for best recovery of metallics from the slag: —0.03C stainless can be made on magnesite bottoms but chromite hearths stand up better under the high temperatures needed for fast, economical melting practice.

Practically all —0.03C stainless is made by using oxygen to reduce the carbon. Most shops aim at 0.025C in the melt at the end of carbon reduction period.

Here again the new easily melted chromium pellets come in handy as they contain no carbon. Not brought up in the meeting but of importance is the fact that one steel maker prefers to melt to a sulfuric acid corrosion test rather than a specified maximum carbon. Considerable experience and precise records of many corrosion tests at various analysis levels are mandatory, however, before such an approach be dared.

Very rare earth meetings

The rare earth meeting filled up early and listened intently to D. C. Schoffstall, Carpenter Steel Co., present a paper on the improved hot-workability of stainless steels containing cerium and lanthanum. The group was greatly disappointed when other papers and discussion of this "hot" subject were officially cancelled because of time limitations. Very rare earth discussions were held elsewhere, however, with Lan-cer-amp and Misch-metal users comparing notes, stories and keyrings through the whee hours.

Bright and early Saturday morning the more hardy members made an imaginary heat right in the middle of the William Penn's Urban Room. Even more realistic were the preliminaries running in the main laboratory just off the foyer of this educational session. This special heat was not shipped but was generously dedicated to NPA's posterity as a shining example of what can be done under the present allocations system.

Beyond all doubt it was the fastest, cleanest and most perfect electric furnace heat ever made. Of course, it should have been with C. W. Briggs, Steel Foundries Society of America, supervising the charging of #1 Bundles of M80 Forms in a melting practice which the AIME's perfected to the highest state of conservation ever witnessed anywhere.

BETTER CASTING METHODS CUT FORMING DIE COSTS

PLASTER MOCK-UP of nose wheel door doubler with templates made at Northrop Aircraft, Inc.

Costs of grinding and finishing airframe forming dies have been reduced from 50 to 75 pct through use of new foundry techniques. Size of patterns made from expansion plasters may be closely controlled to allow for metal shrinkage. Controlled chilling of metal cast eliminates warpage.

More accurate control of shrinkage and metal solidification in production of sand cast forming dies through new techniques has substantially reduced grinding and labor required to bring dies to final size.

Methods of making close tolerance dies, developed along parallel lines at Northrup Aircraft, Inc., and the Armour Research Foundation of Illinois Institute of Technology, require close tolerance patterns made with expanding plasters and metal with predictable shrinkage characteristics.

Cooling rates controlled

A major cause of poor tolerance in Kirksite dies is warpage caused by differential cooling rates in the mold. These cooling rates can be controlled by controlling metal solidification within the mold with chills and insulation.

Control of shrinkage in cast dies at Northrup Aircraft has been accomplished by converting standard plaster patterns to expansible plaster patterns. Using expanded patterns, dies as long as 4½ ft have been reproduced with an over-all dimensional stability within 0.020 in. of blueprint requirements.

Medium high and high expansion plasters are used for close tolerance patterns. These specially formulated gypsum cements expand uniformly. They have the highest setting expansion of any known gypsum cement. Expansion is controlled by varying the amount of water in the mix.

High expansion plaster is used to compensate for the shrinkage of Kirksite, aluminum and bronze. Since the material will expand as much as ¼ in. per ft, it is generally recommended for the higher shrinkage alloys. It is not dimensionally stable after the plaster cast has expanded to the desired dimensions. The expanded pattern or cast should, therefore, be used as soon as possible.

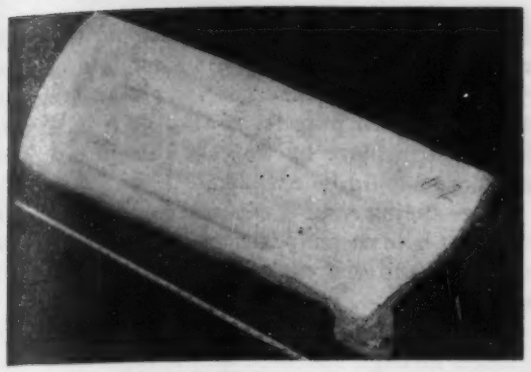
Medium high expansion plaster is designed for use with Kirksite. It is characterized by higher strength, nonweeping, uniform and consistent expansion and dimensional stability after the desired expansion is achieved. It is strong enough after setting to be used as a pattern.

Water content varied

By varying the water content, expansion of medium high plaster may be varied from (maximum) 0.120 to 0.140 in. per ft. Expansion of high plaster may be varied from 0.125 to 0.185 in. per ft. Casts of high expansion plaster should be from 3 to 4 in. deep. Those for medium high expansion plaster should range from 4 to 5 in. in depth. Expansion values can be increased 10 to 15 pct by using hot water of from 120° to 130°F.

Sand molds have facilitated the use of expansion plasters. Patterns of almost any design can be made successfully with shrink allowance. Finer grades of sand, such as 00 Albany, produce the best surface detail. Expanded patterns poured in coarse sand often require some finishing to give desired surface smoothness.

Standard foundry practice is applied to produce the sand molds in which the expansion plaster is poured. When the sand is rammed, it should not be tamped as hard as the sand mold which is used for Kirksite or other metal alloys. A standard size pattern should be used. This pattern is exact in every dimension and will be used later as the master pattern from which the blue block or rub-in splash cast can be made. Before the face of the pattern is covered with sand, it should be coated with parting compound.



CAST FROM MOCK-UP (standard scale) from which blue block and standard plaster pattern is made.

STANDARD PATTERN is rammed up and medium high expansion plaster carefully poured. Sand mold density is less than usual to allow plaster to expand.

After the sand mold is completed, the flask is inverted and the standard scale pattern is drawn from the sand. Caution must be exercised during the removal of the pattern to avoid enlarging the sand mold cavity. Medium or high expansion plaster is then poured into the sand mold. Care must be used when pouring the plaster so that the sand mold surface is not washed away. Sand wash can be avoided through use of a baffle or by pouring through a spout 6 to 8 in. above the sand mold surface. The sand mold should be filled completely with plaster.

It is advisable to imbed two standard steel scales in the plaster cast. As the plaster sets and expands, the impressions made by the steel scales grow larger and indicate the expansion that has taken place. The expanding cast should be left in the sand until the desired expansion has taken place and the plaster has cooled to room temperature.

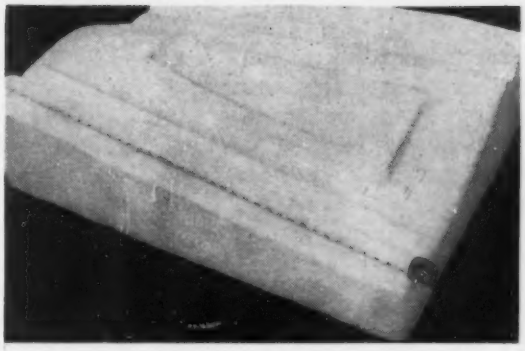
Upon "shake-out," a thin layer of sand will adhere to the surface of the expanded pattern and should be removed with water and a soft brush or cloth. The pattern is checked for size, given the customary two or three coats of lacquer, and then sent to the foundry.

The theoretical shrinkage rate of Kirksite, as it cools from its freezing point at approximately 700°F to room temperature, is about 0.001 in. per in. per 50°F drop in temperature or approximately 0.150 in. per ft over all shrinkage.

Actual shrinkage, however, has been found to vary between 0.080 and 0.140 in. per ft in various sections of the die, depending upon mold hindrance effects and cooling rates.

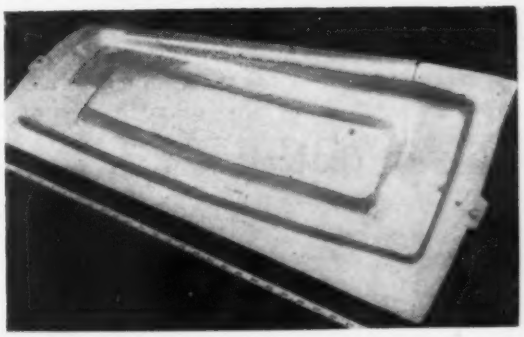
This shrinkage, common to all large sand cast

SHEETMETAL STAMPING proven back to mock-up and blueprint requirements is found to be within requirements.



MEDIUM HIGH expansion plaster after being withdrawn from sand and cleaned is ready for reramming and pouring.

ZINCE ALLOY die ground in with blue block.



Forming dies (continued)

dies can be reduced to between 0.130 and 0.140 in. per ft by controlled solidfication. The method encourages rapid, uniform cooling of the working face of the die so that cooling rates in this area may be controlled irrespective of the section thickness of adjoining areas.

Long, narrow dies tend to warp during solidification due to hardening of metal along the sides and the ends of the mold. An envelope of solid metal is formed. Upon shrinkage, this solid metal tends to distort the die face. To relieve this, it is necessary to insulate the sides of the casting from the chilling effects of the sand with high temperature insulation.

To control solidification, flexible bronze steam hose maybe imbedded in high conductivity facing sand about ½ in. from the mold-metal interface. One length of hose can be used to cover the face of an average die. For large dies two or three lengths may be required to avoid overheating of the cold water which is passed through the hose at a rapid rate but at normal pressure.

A high conductivity facing mix consisting of 3 parts by weight of 00 Albany Sand and 1 part by weight of 30 mesh commercial graphite is used.

High temperature insulation is placed around a pattern before molding and rammed securely in place. Facing sand, about 1½ in. thick, is riddled over the pattern and rammed into a ½ in. hard layer. The hose is placed over the facing sand in parallel rows 2 or 3 in. apart, and held in place by weights. Sharp bends in the hose should be avoided.

More facing sand is rammed in place over the hose to hold it in position. The weights are removed and the mold rammed in the usual manner.

Shortly before pouring the casting, water is passed through the hose and a rapid flow rate is maintained to prevent formation of steam in the hose. Best results are obtained with pouring temperatures above 825°F.

Certain shapes and sizes of dies require both mold chilling and insulation. Neither mold chilling nor insulation is needed on dies under 18 in. square. Both mold chilling and insulation are necessary in the production of long, narrow dies.

As a rule a reduction of 50 to 75 pct in grinding and polishing time may be realized with these methods depending upon the size and shape of the die.

The molding time for a 6000 lb die was increased from 5 hr to 6½ hr. As a result of this additional foundry labor the ⅜ in. warpage normally encountered was reduced to 1/32 in. This reduced grinding and finishing time from 30 hr to 12 hr.

NEW BOOKS

"Minerals Yearbook 1949," prepared by the Bureau of Mines, records the development and production of the nation's mineral facilities. Innovations included data on minerals produced in other nations, the United States' territories and possessions. Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. $4.50. 1661-p.

"Alloys In Cooperland," by George Black, adapts a popular children's book technique to tell the story of Cooperland, "the magic city of stainless alloys." Designed to appeal to executives, engineers and PA's with young hearts, the story is told by the friendly old Alice In Wonderland Walrus. Cooper Alloy Foundry Co., Hillside, N. J. Complimentary copy to those in chemical and allied industries. Others, $1.00. 24-p.

"Chemical and Physical Determinations for Porcelain Enamel Plants," by Michael Bozsin, gives the ceramic engineer the information he needs to study chemical and physical conditions of a porcelain enamel furnace and their effects on finished ware. Sections of the book have previously appeared as individual articles by the author. To these much new material has been added and many related reference tables and charts have been included. Apparatus necessary for various tests is also described. Ferro Corp., 4150 East 56th St., Cleveland 5. $3.00. 76 p.

"The Seamless Story," by J. Perc Boore, relates the struggles of many men to design machinery for and to sell a now widely used product—seamless tubing. It is a most readable story of inventions and inventors. The material was gathered from manuscripts on two continents. The author, for more than 40 years connected with production and sales of seamless tubing, developed his book from a lifelong curiosity to learn how the hole got in the tube. The Commonwealth Press, Inc., 1507 Delong St., Los Angeles 15, Calif. $5.75. 285 p.

"Inspection and Gaging," by Clifford W. Kennedy, is a comprehensive training manual and reference work on the technique of inspection. The place of inspection in industrial quality control, the machinery and tools for gaging and measuring, and the duties of inspection personnel are discussed. The book, written in easy-to-understand language, will aid inspectors to better understand the relation of inspection to other phases of manufacturing. The Industrial Press, 148 Lafayette St., New York 13, N. Y. $7.50. 502 p.

—Free Literature—

Continued

Precision die sets

The new 112-p., hard-cover catalog of Baumbach die sets gives illustrations and technical data on the entire line. Ruggedness and long wear are essential factors in the design of the die sets. Rigid inspections at each operation and final assembly insure conformity to high manufacturing standards. *E. A. Baumbach Mfg. Co.*

For free copy insert No. 15 on postcard p. 119

Roller chains

How Baldwin-Rex double pitch roller chains can effect both cost and weight reductions in drives and conveyers is described in a new 12-p. bulletin. Charts, photos, diagrams and tables show the product in detail, standard attachments available, and describes double pitch chain sprockets. *Chain Belt Co.*

For free copy insert No. 16 on postcard p. 119

Hydraulic drill

A new 12-p. catalog describes Delta hydraulic drill units. The units are of simple design and have been developed for drilling, reaming, tapping, chamfering and similar operations. They are adaptable to special machines for use in high production work. *Rockwell Mfg. Co.*

For free copy insert No. 17 on postcard p. 119

Low-pressure cells

Baldwin low pressure cells in capacities of 0-10 to 0-100 psi, intended for measuring variations in gas or liquid pressures are described in a new leaflet. Included in the bulletin are illustrations of the cells, wiring and dimensional diagrams and specifications. *Baldwin-Lima-Hamilton Corp.*

For free copy insert No. 18 on postcard p. 119

Contour follower

A new 4-p. bulletin describes GE electric contour follower systems for machining irregularly shaped parts. One, two and three-dimension tracer control systems for use on lathes, boring mills, milling and drilling machines are discussed. Components, features and operation of each system are given. *General Electric Co.*

For free copy insert No. 19 on postcard p. 119

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NEW equipment

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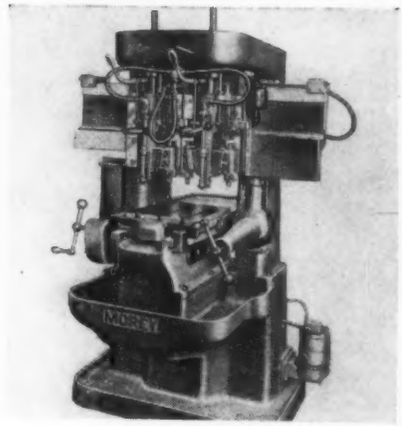
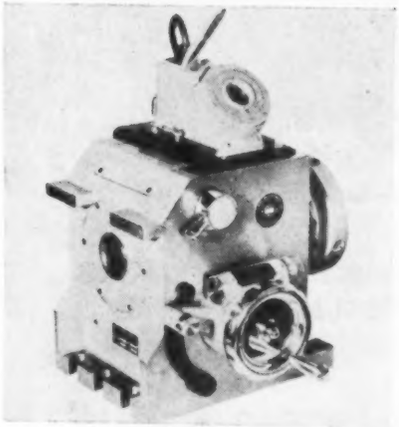


Profiling and milling machine has been improved

The new Morey high speed vertical profiler and milling machine is equipped with improved spindle bearings. There are splined shafts in place of keyways, including the spindle. Other new features are hardened and ground steel ways on the cross-slide; the travel-head is mounted on rollers which ride on ball bearings to eliminate friction and assure quick, easy movement. For easier operation the gear train has been simplified and the control handle relocated. Standard equipment now includes slotted table, table and cross-slide stops, a drawbar and collet. Designed for economical duplication of small parts requiring accurate interchangeability, the profiler is available in the double spindle type. *Morey Machinery Co., Inc.*

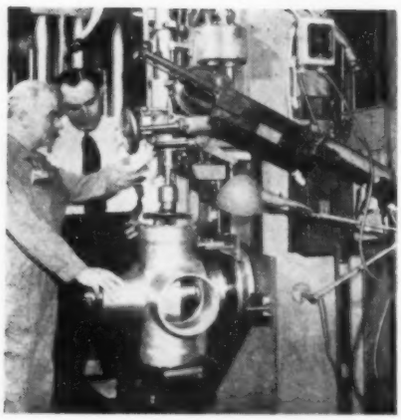
For more data insert No. 20 on postcard, p. 119



Optical dividing head speeds precision inspection

The optical dividing head with a fixed base was developed for use in inspection applications and as a production tool for checking angular dimensions such as the spacing of spur gear and ratchet teeth, measuring eccentricity and contours of cams and other shapes, accuracy of milling cutters, broaches, etc., and for use on machine tools where precise positioning is required. Measurements are made optically by alignment of visible scales; accuracy is independent of mechanical wear, gears, backlash or thickness of oil film. Any one of a series of measurements is reproducible regardless of direction of spindle rotation. Readings are made at normal eye level. Measurements are read directly, on a large, easy-to-read scale. Positioning the work is quick and precise. *F. T. Griswold Mfg. Co.*

For more data insert No. 21 on postcard, p. 119



Drill press converted into brushing tool

By converting a drill press into a high speed production brushing machine, an aircraft manufacturer saved the cost of new equipment and considerable time getting into production on an operation vital in the manufacture of variable pitch propellers. A method for removing the particles of fragmented metal and smoothing peaks left on the diameter of a shot-peened hub bearing area was worked out by mounting an Osborn wire brush on a drill press equipped with an air operated ram and timer. The propeller hub is placed in a holder on the drill press. After the machine is actuated, the automatic timer runs the brush through the cycle at 900 rpm. Various diameters of brushes are used to suit the different hub sizes. *Osborn Mfg. Co.*

For more data insert No. 22 on postcard, p. 119

Wet-blasting unit

Used for deburring, descaling and general surface cleaning, the Pressure-Blast, Jr. is easily installed, requires only one ⅜-in. water connection, one ⅜-in. air connection (standard shop pressure) and a single 110 v line for blower operation and lighting. Of stainless steel construction with sweat copper plumbing, the new model uses any abrasive from 75 to 5000 mesh. *Cro-Plate Co.*

For more data insert No. 23 on postcard, p. 119

Instant dry metal coat

A combination rust inhibitive primer and finish coat normally dries within 10 to 15 min. It has quick drying and weather resistant features usually associated only with baked coatings. Adhesion is said to be excellent even over smooth aluminum and galvanized surfaces, and is usable for either interior or exterior finish. A ½ pt sample will be sent, free of charge, to any industrial user who will write in on company letterheads requesting such a sample. *Wilbur & Williams Co.*

For more data insert No. 24 on postcard, p. 119

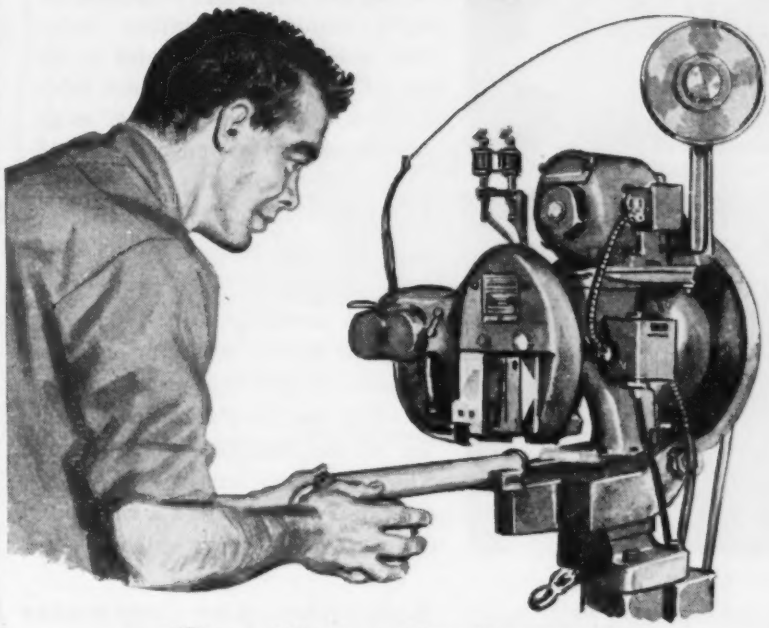
Variable speed drives

Mechanical automatic control is available on the Series 1000 fractional hp Vari-Speed Motodrives. They are manufactured in ¼, 1/3, ½ and ¾ hp sizes with speed variations as high as 10:1. Motodrives are compact: each a complete variable speed power plant, consisting of the Reeves speed-varying mechanism and any standard motor, with built-in helical gear speed reducer optional. *Reeves Pulley Co.*

For more data insert No. 25 on postcard, p. 119

Turn Page

How to cut assembly costs by stitching metal and other materials together



"Waste neither time nor money, but make the best use of both."

—Ben Franklin, 1748

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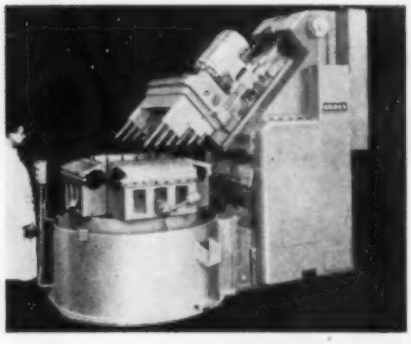
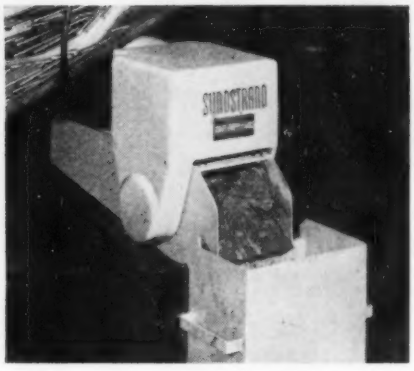


New machine finishes cylinder heads

Drilling and chamfering cylinder heads at the rate of 170 per hr at 100 pct efficiency are accomplished on a special machine tool. It drills 12 angular holes and counter-sinks eight manifold mounting holes. Only one unskilled operator is required. A heavy duty index table incorporates a manual as well as an automatic control cycle. Fluid motor drive prevents damage to the table by jamming while indexing, often caused by improper loading or carelessness on the part of the operator. It is simple to reverse the rotation, remove the obstruction and continue the operation. Other features are hydraulic feed and construction to JIC standards. *Cross Co.*

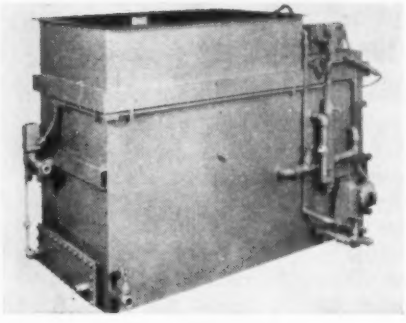
For more data insert No. 26 on postcard, p. 119



Magnetic coolant separator is easily installed

Designed for installation on many types of grinding, honing and gear shaving machines, an automatic magnetic coolant separator is easily installed in open type coolant tanks, or often can be placed directly on top of the machine coolant tank. The separator cleans the coolant as the liquid passes under a revolving drum of solid Alnico which is permanently charged. The coolant is directly exposed to the magnetic drum without interference from non-magnetic insulators. Separated material is removed from the drum by a scraper and deposited in an easily removed receptacle. *Sundstrand Magnetic Products Co.*

For more data insert No. 27 on postcard, p. 119



Solvent-vapor degreaser has been redesigned

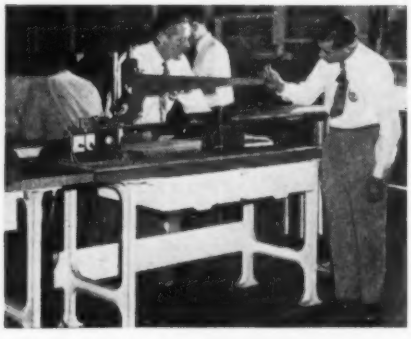
The production cleaning machines included in series VS-800 make use of non-flammable chlorinated hydrocarbon solvents, either trichlorethylene or perchlorethylene for the complete and high-speed removal of oil and grease from all kinds of metal products. The usual cycle of operation is vapor cleaning, then flooding clean solvent over the work with a hand spray, followed by the usual pure vapor cleaning phase. The new design clears all projections from inside work space providing unobstructed entrance for work being cleaned. New corrosion-resistant coating is applied to all interior surfaces. *Detrex Corp.*

For more data insert No. 28 on postcard, p. 119

Ratchet rack has new principle in design

Adjustable without bolting, a new ratchet rack permits insertion of rack shelves between upright posts by fork truck. Rack can be height-adjusted at 6-in. intervals. A special device automatically holds rack at desired height. Shelves can be moved anywhere on rack, solving many space problems. Three models are available: standard, heavy duty, and extra heavy duty. *Boroughs Mfg. Div., American Metal Products Co.*

For more data insert No. 29 on postcard, p. 30



Wall thickness gage speeds quality control

A precision gage has been developed at Fairchild Aircraft to determine the exact wall thickness and concentricity of lengths of tubing up to 6 ft long or more. Straight and tapering tubes can be checked with equal facility. The instrument consists of two horizontal arms having contact points wired to an electronic 100 v control box with transformer, amplifier, relay and light for visual and horn for audio indication. Difference between two vernier micrometer readings when points touch the inside and outside walls of test specimen gives actual wall thickness, accurate to 0.001 in. *Fairchild Aircraft Div.*

For more data insert No. 30 on postcard, p. 119

New Equipment

Continued

Cuts 1/8 in. steel

The Samson No. 40 slitting shear has a blade 14 in. long which makes it suitable for cutting wide strips of light gage metal in one stroke of the hand lever. The offset frame permits slitting sheets of any length or width, faster and with fewer strokes. Model 40-S has straight blades; Model 40-C has special blades for shearing corrugated sheets up to No. 16 gage. *Julius Blum & Co., Inc.*

For more data insert No. 31 on postcard, p. 119

New spark plug

Operating on a new design principle, a new spark plug fires in complete circle of fire around center electrode. It features permanent gap setting, non-fouling design, and improves with use. Improved combustion, easier starting, increased fuel economy and better all-around engine performance are other advantages. *Cir-O-Fire Spark Plug Co.*

For more data insert No. 32 on postcard, p. 119

Closing attachment

To fill the need for an inexpensive toolroom type collet closing attachment a hand wheel operated unit has been announced. All wearing parts are hardened and the hand wheel is self-centering on the spindle. *Crozier Machine Tool Co.*

For more data insert No. 33 on postcard, p. 119

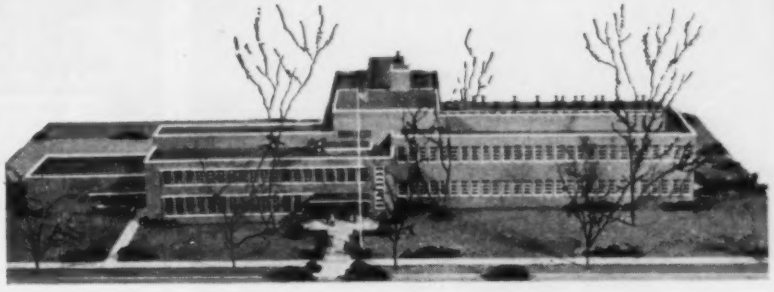
Tang break-off tools

Operating on the principle of a spring-loaded center-punch, automatic tang break-off tools remove tangs on helical-wire thread inserts quickly without disturbing the inserts. Fourteen models permit tang-removal operations at production rates. *Heli-Coil Corp.*

For more data insert No. 34 on postcard, p. 119

Turn Page

The New Home for Your Cleaning Problems



Main building of the new Research Center at Wyandotte, housing laboratories and offices of the Research and Development Division.

Now under construction, Wyandotte's new Research Center will be headquarters for investigation of cleaning techniques and product applications. Spreading over almost two city blocks, these new laboratories, together with enlarged pilot plants and existing facilities, are designed and equipped to accomplish research with the greatest efficiency.

This will be the new location for the metal-cleaning laboratories, set up to handle every metal-cleaning operation. . . . There's a plant-size power washer, a complete set of plant cleaning and plating tanks . . . barrel finishing equipment, corrosion test facilities, a water wash paint spray booth, and more. Everything required to help develop, test and perfect products for the cleaning and finishing of metals.

This new Research Center represents only one phase of the expansion program at Wyandotte. To meet the increased demand for Wyandotte products, we've added to production facilities . . . augmented our Technical Service Department to give you the best available technical help.

Be sure, when *you* have a cleaning problem, to bring it to Wyandotte. Just call our Representative.

"Cleaning the World"

THE WYANDOTTE LINE—products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.

Wyandotte CHEMICALS
REG. U. S. PAT. OFF.
Wyandotte, Michigan
Service Representatives in 88 Cities

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

STEEL HAND AND POWER
CHICAGO **BENDING BRAKES**

For Single and Quantity Runs
Bending Steel Plate and Sheet Metal

Special Bending Brakes
Double Folder Brakes

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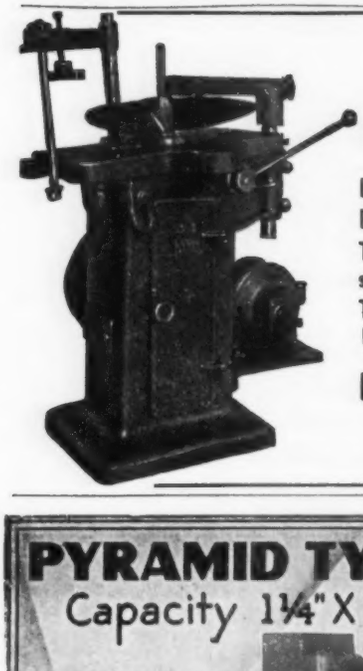
STRENGTH UNIFORMITY DURABILITY

NEEDLE
and
STAINLESS

THE CARPENTER STEEL CO.
Webb Wire Div.
NEW BRUNSWICK, N. J.



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Low in Cost. Durable.
Easy to operate.
Table adjustable for straight or taper keyways.
Three sizes. Keyways 1/16" up to 1".

DAVIS KEYSEATER CO.
400 Exchange St.
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"I SAW IT IN THE IRON AGE,"
is a common phrase in the metalworking industry. Let the industry say it about your product.

THE INTERNATIONAL HARDNESS SCALES
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are included in Our Improved Portable Scleroscope Model D-1. This efficient Single Scale tester registers Brinell-Shore values under otherwise inaccessible conditions. 100% portable for floor and field work, dead soft metals or superhard steel either of brittle or thin cross section, non-destructive, accurate, speedy, always ready and fool-proof.
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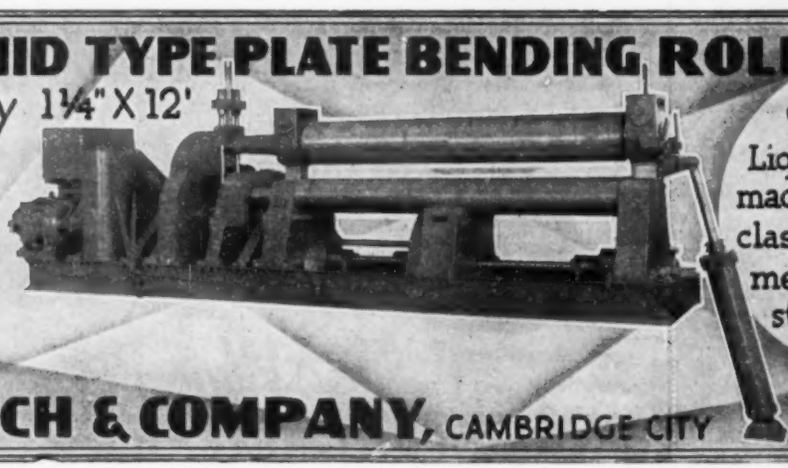
THE SHORE INSTRUMENT & MFG. CO., INC.
9025 Van Wyck Ave., Jamaica, N. Y.

PYRAMID TYPE PLATE BENDING ROLL
Capacity 1¼" X 12'



Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work.

BERTSCH & COMPANY, CAMBRIDGE CITY INDIANA

Pump-filter unit

This compact combination pump and filter unit was built for filtering the liquid used in testing refrigerator compressors. It is semi-portable and suitable for tanks up to 1000 gal with a Ruthman motor driven pump. The pump is a bronze Rumaco model 2-C, with 1½ hp heavy duty driving motor, and a capacity of approximately 2000 gph, at 36 lb pressure. This completely circulates the liquid through the filter twice each hour. The bronze Cuno Micro Klean Filter has six cartridges of medium density. *Ruthman Machinery Co.*

For more data insert No. 35 on postcard, p. 119

Temperature control

Accurate indication and control of temperatures ranging from —100° to +300°F are possible with new resistance thermometers applicable in a wide variety of industrial processes. Three basic types are available: the HP-11 resistance-thermometer indicator; HP-13 two-position controller or protector; and HP 14 three-position controller. Each type is designed for flush or surface mounting and uses the same basic mechanism, a crossed-coil moving element and a high-strength 3¼ lb Alnico V magnet, designed for hard usage and reliable operation. The entire mechanism is enclosed in a dust-tight, moisture-resistant case-and-cover assembly that permits its use in moist or contaminated atmospheres. *General Electric Co.*

For more data insert No. 36 on postcard, p. 119

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Parts • Accessories • Attachments for All Standard Make Machines

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Our Ten Million Dollar Tool Crib Is Serving Big & Little Plants that want Tooling In A Hurry! Everything GUARANTEED against Material or Mechanical Defects.

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Los Angeles 13, Calif. Phone Michigan 7891

We'll buy Manufacturing Plants, Complete Machine Shops, Large Inventories of Tooling.

MORE FLEXIBILITY IN YOUR SHOP

Harden, heat treat, temper and anneal with one furnace . . the Johnson No. 706.

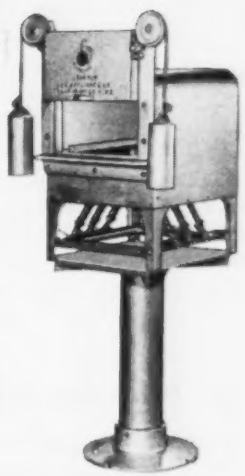
Another in the Johnson line of dependable gas equipment has won its place in both large and small shops and plants. Operators like its easy adaptability. Six Johnson Direct Jet Bunsen Burners with individual shut off valves and pilot lights provide steady, easily controlled heat from 300 to 1850° F. Semi-muffled type with burners operating below Carbofrax hearth. Firebox: 7"x 13"x 16½". Also available bench style. Write for complete and factual information.

A smaller version of this highly flexible furnace is the No. 654. Four burners deliver 300 to 1800° F. Firebox: 5" x 7¾" x 13½". Available as pedestal or bench style.

JOHNSON GAS APPLIANCE CO.
598 E Avenue, N. W., • Cedar Rapids, Iowa

Johnson No. 706 Pedestal Style	$278.00
Bench Style	$250.00
Johnson No. 654 Pedestal Style	$150.00
Bench Style	$124.00

F.O.B. Factory



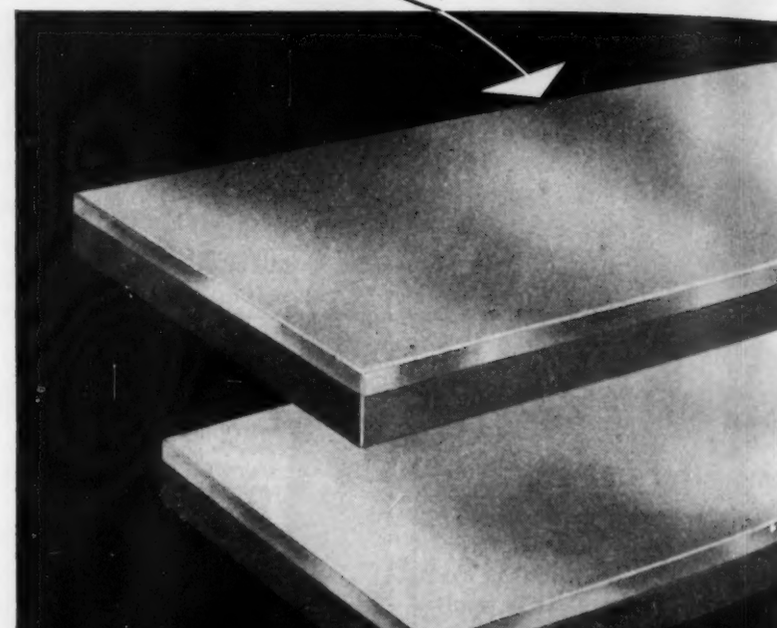
Model No. 706

JOHNSON
INDUSTRIAL GAS EQUIPMENT

Furnaces • Burners • Torches • Valves • Mixers • Blowers

STAINLESS-CLAD

makes stainless steel go farther



Stainless-clad steel makes a ton of stainless steel go much farther... helps to conserve available supplies of this critical material.

Many fabricating companies have found CF&I Stainless-Clad Steel is the solution to their problem of maintaining or increasing output in the face of restricted supply — where operating conditions permit.

CF&I Stainless-Clad Steel is a composite metal consisting of stainless steel permanently bonded to a carbon steel. It is produced under close quality control and is rolled under specialized supervision to insure uniformity of the finished plate.

Easy to fabricate, CF&I Stainless-Clad is being used to good advantage in numerous applications where corrosion resistance or other characteristics of stainless steel are required. For more detailed information, write to Claymont Steel Corporation, Claymont, Delaware.

Large Diameter Steel Pipe . . . Carbon Steel Plates . . . Flanged and Dished Heads

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STAINLESS-CLAD STEEL

PRODUCT OF

CLAYMONT STEEL CORPORATION

SUBSIDIARY OF THE COLORADO FUEL AND IRON CORPORATION

Washington Statements Don't Help Wage Climate

Bargainers still poles apart early this week . . . Keeping steel production going now seen squarely up to government . . . Plate directives multiply as essential needs increase.

Statements by Washington officials have helped shatter the faint hope that some "miracle" of collective bargaining could pave the way for peaceful settlement of the steel wage-price impasse. Almost overnight steel users and producers have taken a dim view of chances for a quick settlement. It is now squarely up to the government to keep vital steel production going. (See p. 59.)

Early this week the bargainers were still poles apart. The steel union had thumbed its nose at the Wage Stabilization Board's formula which would permit a 5¢ an hr wage increase. Instead it had outlined a 22-point program of demands which would constitute practically a completely new contract, and which some steel firms estimate would be equal to an increase of 48¢ to 53¢ an hr.

Stage Is Set—Some steel people feel that Washington has made no real effort to realize the seriousness of the situation—at least from their viewpoint. They have said time and again that government controls both wages and prices. And just as often they have said that no wage increase could be granted without a price increase to cover the higher cost.

Steel observers who have seen this play more times than they care to recall believe this setup spells plenty of trouble. This week it looked as if the issue could bypass the Wage Stabilization Board and head straight for the White House. The stage was set for the President once again to reluctantly invoke the Taft-Hartley Act and appoint a steel panel. Even a miracle of compromise by the union and U. S. Steel would require an okay by WSB.

Bad Climate—This week such a compromise did not seem possible. The new Economic Stabilization Administrator had given the cold shoulder to any hope that steel firms could, as a last resort, trade a wage increase for price relief. This was another indication that Mobilization Chief Wilson will take a strong stand against either a wage or price boost above presently authorized limits.

None of this has improved the climate for collective bargaining. Pittsburgh conferences were not only reported fruitless, but "leaks" from the meeting room made it clear that considerable bitterness was being generated.

Big Gun — It's a safe bet that Phil Murray will risk a strike (he has authority to call one) rather than accept what he feels is an inadequate increase within the bounds of the wage stabilization formula. He could not be unmindful that John L. Lewis will be around next April to see what he can get for the miners.

Last-minute doubletalk on fringes, productivity, differentials and cost of living may be introduced to help save faces. But steel firms won't raise wages without prices. Whether or not a price increase under the Capehart Amendment covering cost increases up to last July would be a successful sop—or would allow enough wage increase to satisfy the union—remains to be seen. Some steel firms claim that these adjustments should allow an increase of close to $5 a ton.

Need Plates—In the steel market, plate demand by defense and supporting industries has reached the point where Washington planners are considering dusting off the system used during World War II to get more plate production. This would mean actual approval of rolling schedules. This would involve a tremendous amount of detail, and there may not be enough experienced people available in Washington to make the system work as it did during the war.

The plate load is terrific. And increasingly frequent directives are adding to the confusion. It is getting to the point where consumers who thought they were secure with tonnage on mill order books may find themselves out in the cold, or pushed way back on the rolling schedule. National Production Authority will probably sacrifice more lighter gage flat-rolled products in order to get more plate production.

Tight Squeeze—Hot-rolled bars, shell steel and cold-drawn bars are also among the tightest steel products. The latter product is especially tight because of limited hot-top capacity. Cold-drawn quality requires a "killed" steel practice which involves use of hot-topped ingots. NPA is now trying to learn how much of the hot-top grades are going to producers of military items.

Steelmaking operations this week are scheduled at a new high of 104.5 pct of rated capacity, up half a point from last week.

This high rate of steelmaking was scheduled in spite of bitter winter weather which was hampering operations in some areas. Helping the production record are new facilities, part of the industry's huge expansion program which are joining the effort.

GET IN THAT IRON AND STEEL SCRAP!

An Emergency FACES AMERICA'S STEEL INDUSTRY!

America's steel industry must have more scrap *immediately* if it is to meet defense production needs. The shortage of scrap is now the worst it has been since the days of Pearl Harbor. Steel production is bound to slow up unless scrap supply improves!

The odds and ends of scrap in your plant may not seem to amount to much. But it may be more than you think, and even small amounts are important. Added together, the scrap from industrial plants throughout the country will make hundreds of thousands of tons of vital steel.

Look around your plant, warehouses and yards for all the scrap you can find. Worn out machines, tools, pipe, boilers, structural parts—anything of iron or steel that can be spared. Sell them to your scrap dealer *now*. Every bit will help to meet this emergency.

Scrap Metal Market Conditions Described As Wholly Unsatisfactory
Mill Stocks Of Scrap Generally At Critical Low
Steel Warehouse Trade Participating In Collection Drive
PITTSBURGH —The steel
Steel Scrap Supply Continues Tight On The Pacific Coast
SAN FRANCISCO. — The steel scrap supply continues tight in the Bay Area,
SCRAP DRIVE HERE TO BE STEPPED UP
Commerce Department Office to Scout Auto Graveyards to Supply Steel Mills
The regional office of the Department of Commerce here is stepping up its campaign through-
Scrap Supply Seen As Most Critical Problem
Industry Men Meeting
Ovens, Blast Furna
Get Prio
WASHINGTON — Construction
mobilization officials met
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Plan, the program for e
shortage, and the probable
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making 21,125,000 ton
in the first quarte
WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
NATIONAL STEEL CORPORATION
NATIONAL STEEL
Steel Producers Seek More Scrap From Industrial Consumers
NEW YORK —Nati
rate of steel producti
companies scraping th
their stock piles of scra
mer when normally the
their inventories
Demand on Steel Continues Stron
The defense program's dem
for steel are being stepped
orders from manufacturer
durable goods an
industry
STEEL INVENTORIES REACH A MINIMUM
Deliveries to Warehouses Are Expected to Drop by 23% During Fourth Qu

Market Briefs

new start—A multi-million dollar Army Ordnance contract has been awarded to American Steel Foundries for the reactivation of the government-owned cast armor plant at East Chicago, Ind., and for the production of tank hulls and turrets. Conditioning of the plant has been underway for several months under a letter of agreement order. More than 6000 persons are expected to be employed when the plant hits peak operations.

wages up—October payroll for the iron and steel industry is estimated at $249,856,000, higher than in any other month, according to American Iron and Steel Institute. Ten-month total of $2.4 billion exceeds the total for any full year. Average hourly wage in October was $1.931, compared to $1.938 for 1951 to date. Estimated total employment for the month was 674,000, off 5100 from August's record peak, but almost 24,000 higher than in October, 1950.

fast service—U. S. Steel Corp.'s private wire service has been fully converted to automatic controls to speed up handling of messages between plants and offices of the company. New push-button telegraph switching centers were put into operation this week in New York and Pittsburgh, replacing the cord-and-plug type centers. Other principal switching centers previously converted are Chicago, Cleveland, Birmingham, St. Louis, San Francisco and Los Angeles. Four years were needed to complete the conversion.

king coal—More coal and coke were moved on the Ohio River during 1950 than any other commodity, according to Army Engineers. Preliminary figures show that 23,859,986 tons of these materials were barged over the river. In second place was petroleum and petroleum products with 11,733,085 tons.

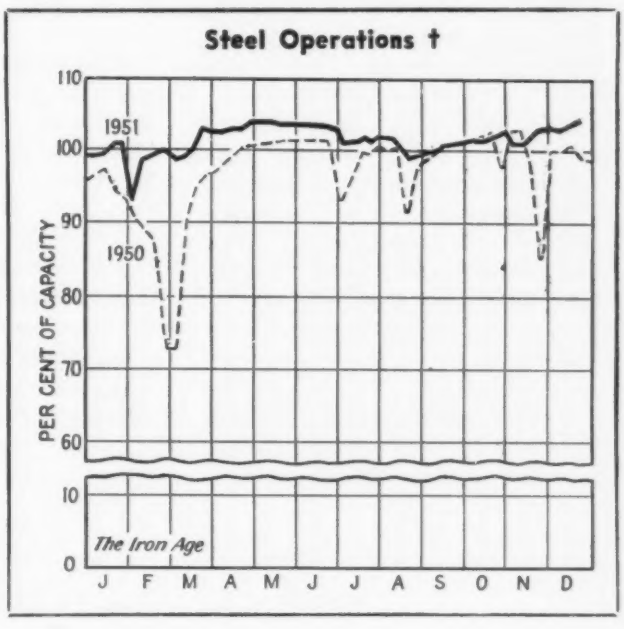
demand off—There are offerings of foreign pig iron in the Philadelphia district at prices ranging from $70 to $90 per gross ton. But there aren't any takers. One supplier appraises the market at about $65 per ton for this iron.

new plant—Basic refractory chrome-magnesite brick and high temperature cement will be produced at E. J. Lavino's Newark, Calif., plant, now under construction. Plant will cost about $2.5 million and will occupy 50 acres.

late delivery—One half the reporting members of the Chicago Purchasing Agents Assn. stated deliveries by vendors were about the same during November as in October. However, one third of the replies to the monthly business survey indicated that vendor deliveries were shorter during November, a 100 pct increase over those so reporting in October. Backlogs of orders were reported to be on the downgrade.

exempt—Domestic antimony ores and concentrates are among several industrial materials now exempted from price control by Office of Price Stabilization. List of exempted items also includes synthetic crystals, graphite foundry facings, and soapstone and serpentine dimension building stones. OPS has also broadened the definition of exempt acid grade fluorspar in an attempt to encourage domestic production.

plan mill—State government of Sao Paulo, Brazil, is reported planning a steel mill to rival Volta Redonda, biggest thus far in South America. Preliminary plans are ready, but final site has not been chosen. Initial capital is planned at about $90 million, with the government putting up 50 or 51 pct, private investors the rest.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Dec. 9	101.0	107.0	103.0	101.5	104.0	104.0	104.0*	109.0*	105.0	104.0	98.5	93.5	103.0	104.0
Dec. 16	100.0	106.5	103.0	101.5	105.0	104.0	100.5	109.0	105.0	104.0	95.5	93.5	106.0	104.5

† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.
* Revised.

DPA Okays Kalispell Aluminum Plant

Agency overrules Interior Dept., directs it to negotiate power contract with Anaconda . . . May ask further aluminum expansion . . . Olin Industries a possibility—*By R. L. Hatschek.*

Defense Production Administration put its stamp of approval on the proposed Anaconda Copper-Harvey Machine venture into the primary aluminum industry. DPA chief Manly Fleischmann, with Charles E. Wilson's backing, has directed Dept. of Interior to negotiate a long-term power contract with the new producer.

Needs Urgent—Mr. Fleischmann took the realistic attitude that Anaconda was the best choice of a company to operate the 72,000-ton smelter at Kalispell, Mont. His reasons were (1) it will cost the government less, (2) it will get the plant operating sooner than any other could and (3) by virtue of Anaconda's extreme competence in the metallurgical industry, it will be best able to provide the desired additional competition in this industry.

The plain fact is that military demands for aluminum have soared higher than anticipated. The aircraft program is being swelled from the original 95 wings to a proposed 143 wings—meaning that the civilian aluminum market will not loosen and may get even tighter.

Wrench in Works—It's still going to be a tough job negotiating for the Hungry Horse power. Anaconda must have a really firm, really long-term contract sewed up before the company can even think of laying out the capital required for the project. Otherwise, Interior could just about cut off the power as soon as the Defense Production Act of 1950 expires and DPA goes out of existence.

Still More?—Mr. Fleischmann has further indicated that he would still like to see Olin Industries in aluminum production. This is in line with discussions now going on among defense officials concerning a further expansion in the domestic aluminum industry—a move which might be necessary to fulfill aluminum consumers' dreams of an ample supply in 1953.

Allocations Coming—Copper and zinc allotments for the first quarter are expected momentarily from the International Materials Conference. Allocations for tungsten, molybdenum, nickel and cobalt are also forecast before the end of the year, despite the fact that considerable work remains to be done by the respective IMC committees.

The international agency isn't pushing the case for copper stockpiling at this time, primarily because of the weight of military and civilian demands for the red metal. Need for stockpiling is "recognized and maintained" by IMC, however.

Secondary Output Lags—Domestic production of crude copper from secondary sources was less than 2000 tons in November, according to Copper Institute figures. This is a decline of over 5000 tons from the production rate of 6 months ago. Primary production dropped some 5000 tons from the previous month to 80,938. Deliveries to fabricators totaled 123,746 tons, maintaining the high level only by virtue of the copper being removed from the government stockpile, and refined stocks of industry showed a drop of some 10,000 tons.

Tin Rumors—A pair of rumors had opposite effects on foreign tin prices last week. First it was rumored that Reconstruction Finance Corp. might buy Malayan tin if the price fell to "about $1.00 per lb" and the immediate effect was to depress the Singapore market to about the c.i.f. New York equivalent of $1.14. A later rumor, that the pound sterling was to be freed, was followed by rising prices in London.

It has also been reported that dickering was started by members of the government's tin mission in the Far East on the subject of Indonesian tin. The discussions are slated for continuation in Washington. It is understood that RFC would like a 2 to 3-year arrangement while the Indonesians prefer something like 3½ to 4 years. Nothing on prices was intimated with the exception that both sides feel an agreement can be reached.

Lead May Ease—National Production Authority last week went on record as believing that lead supplies would improve early next year for cable makers. This is by virtue of NPA's taking over allocations of scrap and foreign lead. But other trade sources point out dropping imports.

NONFERROUS METAL PRICES

	Dec. 12	Dec. 13	Dec. 14	Dec. 15	Dec. 17	Dec. 18
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.03	$1.03	$1.03	....	$1.03	$1.03*
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

*Tentative

Note: Quotations are going prices.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢ 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.2¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Manf. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.12	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	1800
Antimony, American, Laredo, Tex.	50.00
Beryllium copper, 3.75-4.25% Be	1.56
Beryllium aluminum 5% be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$215-$218
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.03
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.30
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	32.25
No. 315	30.25
88-10-2 ingot	
No. 210	40.00
No. 215	38.50
No. 245	33.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.00
Grade 2—92-95%	17.75
Grade 3—90-92%	17.25
Grade 4—85-90%	16.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅜
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz. f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19½	17⅞
Red brass	20½	19⅜
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying price, f.o.b New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17¾
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14¾
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16¾—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	10 —11

Zinc

New zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	15¾—16
Battery plates (dry)	10½—11
Batteries, acid free	7 — 7⅛

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	48 —50
Mixed common babbitt	16¼—16½
Solder joints	21 —22
Siphon tops	48 —50
Small foundry type	21 —22
Monotype	18½—19
Lino. and stereotype	17½—18
Electrotype	16 —16½
Hand picked type shells	10 —11
Lino. and stero. dross	8¾— 9
Electro. dross	7½— 8

Scrap Trade Battles on Cold Front

Winter pulls sneak attack . . . Snow, cold slow down scrap output, preparation . . . Midwest yards hardest hit . . . December riddled by holidays, expect first pickup to come in January.

Winter's sneak attack on major steelmaking and scrap collection centers showed the trade its past shortage troubles were only a warmup for the obstacles of freezing weather. Mild weather ended abruptly last week as deep snow covered the Midwest and filtered to the East. Intense cold as an aftermath continued this week.

In New York and other eastern yards, operators had only to brush the minor remains of last week's snowstorm from their yards. But in inland yards snow was causing an alarming cutback in yard preparation work. Cold and snow and dangerous truck transportation conditions narrowed industrial and other scrap outlets.

Scrap men pointed to other difficulties. December is a month riddled with days off and scrap activity was due for a sheer decline no matter what the weather was. This numbing cold and attendant ice and snow will aggravate difficulties.

Now scrap men are saying that it would be foolish to expect any sensational upsurge in scrap collections for the balance of December. Pickup will come in early January—depending on weather conditions then. This means that mills must go deeper into painfully built scrap stockpiles. Whether the scrap pickup comes before some mills reach the bottom of the stockpile will be close.

Washington's awareness of the troubled scrap state was shown afresh by Defense Production Administrator Manly Fleischmann's appointment of a 4-man committee to advise him on scrap matters.

Heading the committee is Robert Warner, Fleischmann's special assistant for salvage operations. Members include Edward W. Greb, Director of National Production Authority's salvage division; Marvin S. Plant, director of the scrap section, NPA Iron and Steel Div., and F. E. Russell, chairman of Defense Transport Administration's scrap reclamation committee.

Pittsburgh—Weather is a worrisome factor in the district scrap picture. The view here is that the bad turn in the weather plus the holidays could lead to furnace shutdowns. A large consumer reported his inventory has improved to 3 days from a low of 0.6 day. However, shipment notices have been dropping off and stocks may again decline. Another mill with an openhearth furnace down for rebuilding will not start it up again until the scrap supply improves. NPA inspectors were checking consumers for excess inventories.

Chicago—Snow storms and cold are having an extremely bad effect on scrap movement. Dealer activity was seriously curtailed with little preparation being done for several days. Scrap from railroads may also be held up as workers are diverted to emergency work. A medium-sized mill shut down a blast furnace last week for 3 months for relining. The loss of this hot metal will further aggravate their scrap supply. Inventories of the leading steel producer picked up slightly and now hovers a little over 8 days supply.

Philadelphia — Extremely cold weather and snow cut outdoor operations severely late last week and early this week. But Jack Frost's outburst is expected to take second place to the coming holidays in cutting total scrap flow in this district. Everyone in the trade anticipates a slow market for the next 2 weeks.

New York—The market here was slower than last week. Scrap men knew they had too many obstacles to buck to make the sensational showing demanded by Washington. They resigned themselves to waiting for a scrap pickup in early January. Cold closed in and slowed down yard work to some extent.

Detroit—The scrap market here is quiet at the moment. Reports of dwindling scrap receipts by the yards continue to come in. Government investigators last week were checking to see if dealers were holding large quantities of scrap. The trade believes there has been little incentive to accumulate scrap in the yards and that Detroit's reduction in scrap flow is largely a matter of cut back auto production.

Cleveland—Heavy snows and below zero temperatures have brought about a general halt in preparation of scrap in this area and slowed or stopped shipments from dealers. Two local mills have announced they are out of the blast furnace scrap market. Openhearth inventories are growing worse.

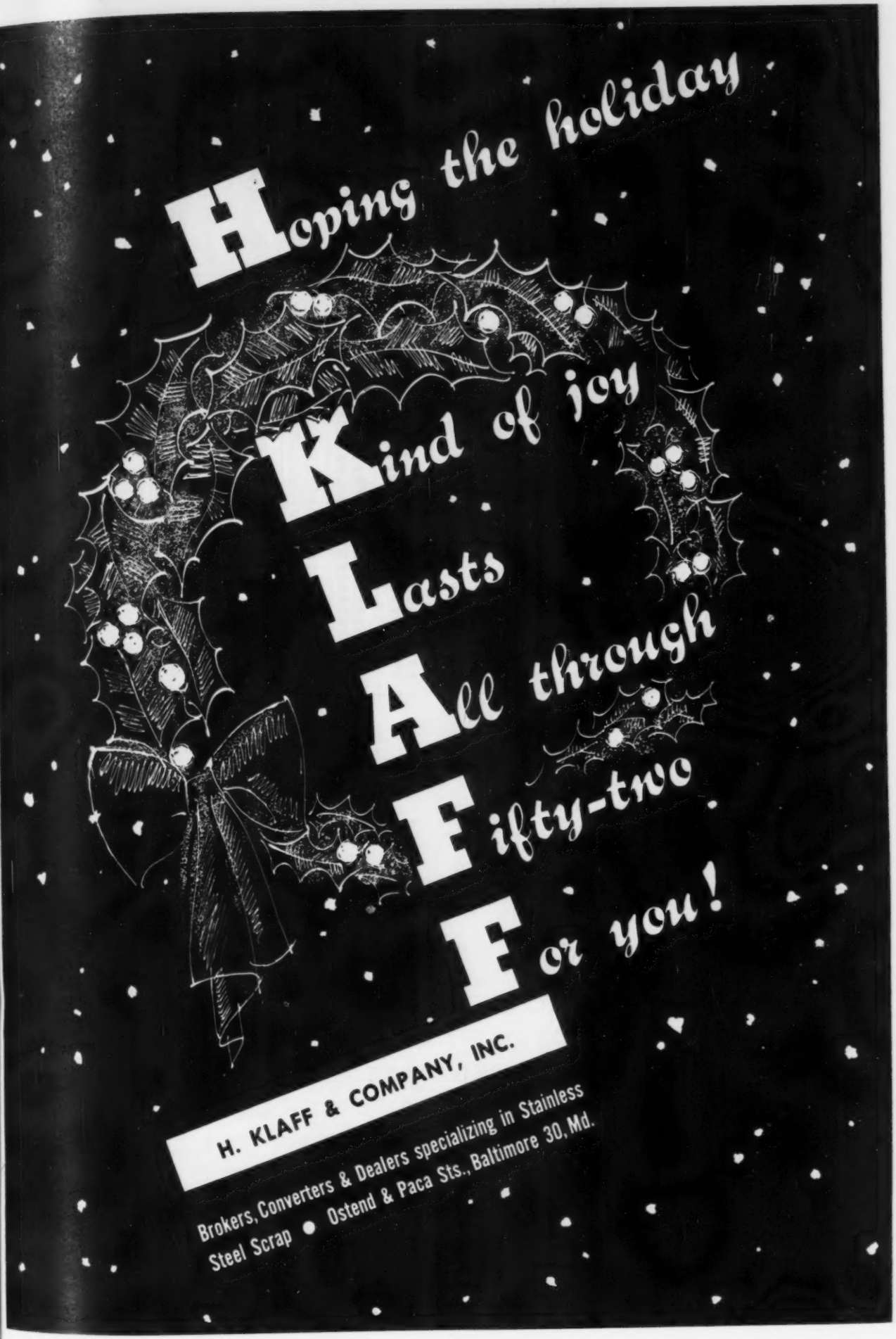
St. Louis—Extreme cold weather further curtailed the already light movement of scrap iron to the St. Louis industrial district, which is sorely in need of material. A large district foundry, switching from railroad specialties which are in short supply, to melting grades, finds it necessary to send out an SOS.

Birmingham—The scrap shortage has steel mills in this area in a bad way, with only a couple weeks' supply on hand and receipts just enough to keep them operating. In contrast, the cast market is easy again.

Cincinnati—Snow and cold have stopped most preparation and movement of scrap in this area. Allocated shipments from southern states to Newport Steel are keeping it in operation. Recent installation of a barge unloading dock at Newport will increase the mill's opportunity for receiving allocated scrap previously denied from dealers located on the Ohio River.

Boston—The bulk of allocations of scrap in this district except for some railroad scrap, is going to American Steel & Wire Co. of Worcester. Railroad scrap is going in smaller amounts to local foundries. Despite the noticeable shortage of scrap in other parts of the country, there seems to be a consistent rate here.

Buffalo—Heavy snow and cold cut scrap flow to a minimum. Outside receipts were virtually halted.


Hoping the holiday
Kind of joy
Lasts
All through
Fifty-two
For you!
H. KLAFF & COMPANY, INC.
Brokers, Converters & Dealers specializing in Stainless Steel Scrap • Ostend & Paca Sts., Baltimore 30, Md.

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →		$0.99	.75	.53	.65	.75	.51	.75	.75	.51	.51	.76	.83	.65	.26	1.34	.79	.50	.20	.51	.20	.52	.47	.51	.51	.51	.95	.50	.78	.50	.43	.51	.33	.57	.88	.82	.88	.88
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Struthers	Warren	Wellton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minneapolis	Houston	Los Angeles, Pittsburg, Cal. Portland, Ore. San Francisco, Seattle
GRADES	OPS No.																																					
No. 1 bundles	1	$44.00							$44.00					$43.00				$42.50						$42.00				$41.00	$41.15	$40.00	$39.50	$39.00			$38.00	$37.00		$38.00
No. 1 busheling	2	44.00							44.00					43.00				42.50						42.00				41.00	41.15	40.00	39.50	39.00			38.00	37.00		38.00
No. 1 heavy melting	3	43.00							43.00					42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00		37.00
No. 2 heavy melting	4	43.00							43.00					42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00		36.00
No. 2 bundles	5	43.00							43.00					42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00		36.00
Machine shop turnings	6	34.00							34.00					33.00				32.50						32.00				31.00	31.15	30.00	29.50	29.00			28.00	27.00		28.00
Mixed borings and turnings	7	38.00							38.00					37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00			32.00	31.00		29.00
Shoveling turnings	8	38.00							38.00					37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00			32.00	31.00		29.00
Cast iron borings	10	38.00							38.00					37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00			32.00	31.00		29.00
No. 1 chemical borings	26	41.00							41.00					40.00				39.50						39.00				38.00	38.15	37.00	36.50	36.00			35.00	34.00		32.00
Forge crops	11	51.50							51.50					50.50				50.00						49.50				48.50	48.65	47.50	47.00	46.50			45.50	44.50		42.50
Bar crops and plate	12	49.00							49.00					48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00			43.00	42.00		40.00
Punchings and plate	14	46.50							46.50					45.50				45.00						44.50				43.50	43.65	42.50	42.00	41.50			40.50	39.50		37.50
Electric furnace bundles	15	46.00							46.00					45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00			40.00	39.00		37.00
Cut struct., plate, 3 ft and less	16	47.00							47.00					46.00				45.50						45.00				44.00	44.15	43.00	42.50	42.00			41.00	40.00		38.00
Cut struct., plate, 2 ft and less	17	49.00							49.00					48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00			43.00	42.00		40.00
Cut struct., plate, 1 ft and less	18	50.00							50.00					49.00				48.50						48.00				47.00	47.15	46.00	45.50	45.00			44.00	43.00		41.00
Foundry steel, 2 ft and less	20	44.00							44.00					43.00				42.50						42.00				41.00	41.15	40.00	39.50	39.00			38.00	37.00		35.00
Foundry steel, 1 ft and less	21	46.00							46.00					45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00			40.00	39.00		37.00
Heavy trimmings	24	43.00							43.00					42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00			37.00	36.00		34.00
Hard steel, 2 ft and less	30	49.00							49.00					48.00				47.50						47.00				45.00	46.15	45.00	44.50	44.00			43.00	42.00		40.00
No. 1 RR heavy melting	RR 1	46.00							46.00					45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00			40.00	39.00		37.00
Scrap rails, random lengths	RR 14	48.00							48.00					47.00				46.50						46.00				45.00	45.15	44.00	43.50	43.00			42.00	41.00		38.00
Scrap rails, 3 ft and less	RR 16	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00		42.00
Scrap rails, 2 ft and less	RR 17	52.00							52.00					51.00				50.50						50.00				49.00	49.15	48.00	47.50	47.00			46.00	45.00		43.00
Scrap rails, 18 in. and less	RR 18	54.00							54.00					53.00				52.50						52.00				51.00	51.15	50.00	49.50	49.00			48.00	47.00		45.00
Rerolling rails	RR 15	53.00							53.00					52.00				51.50						51.00				50.00	50.15	49.00	48.50	48.00			47.00	46.00		44.00
Uncut tires	RR 20	48.00							48.00					47.00				46.50						46.00				45.00	45.15	44.00	43.50	43.00			42.00	41.00		39.00
Cut tires	RR 21	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00		42.00
Cut bolsters and side frames	RR 23	49.00							49.00					48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00			43.00	42.00		40.00
RR specialties	RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00		42.00
Solid steel axles	RR 25	58.00							58.00					57.00				56.50						56.00				55.00	55.15	54.00	53.50	53.00			52.00	51.00		49.00
No. 3 steel wheels	RR 27	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00			45.00	44.00		42.00
Unassorted	RR 35	40.00							40.00					39.00				38.50						38.00				37.00	37.15	36.00	35.50	35.00			34.00	33.00		31.00

Cast Scrap

(*F.o.b. all shipping points*)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh: Bessemer, Homestead, Duquesne, Munhall. Cincinnati: Newport. St. Louis: Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco: South San Francisco, Niles, Oakland. Claymont: Chester. Chicago: Gary.

SHIPPING POINT PRICES (Except RR scrap)—for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap) — Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C and amend. 4, CPR 5.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Under Amend. 5 to CPR 5 ceiling prices are established for certain unprepared grades. Unprepared steel scrap for compression into No. 1 bundles calls for a $6 differential (or deduction) from the base (No. 1 bundles). Unprepared steel scrap for No. 2 bundles, $9 from base. Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base. Sec. 7 (a) (2) (Railroad grades) is amended to include: Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base.

COMMISSIONS — Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: **Nickel:** $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum:** $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese:** $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon:** electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium:** $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys:** if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings. Ceiling prices on billet, bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer.

See Amend. 5 to CPR for setting of single price on No. 1 Heavy, No. 2, and No. 1 bundles. No. 1 bundles are made prime grade from which to add or subtract differentials. Amendment also puts dealer to dealer sales under ceilings, permitting a $1 resale margin, and trucking charges may be added only on shipments of prepared scrap.

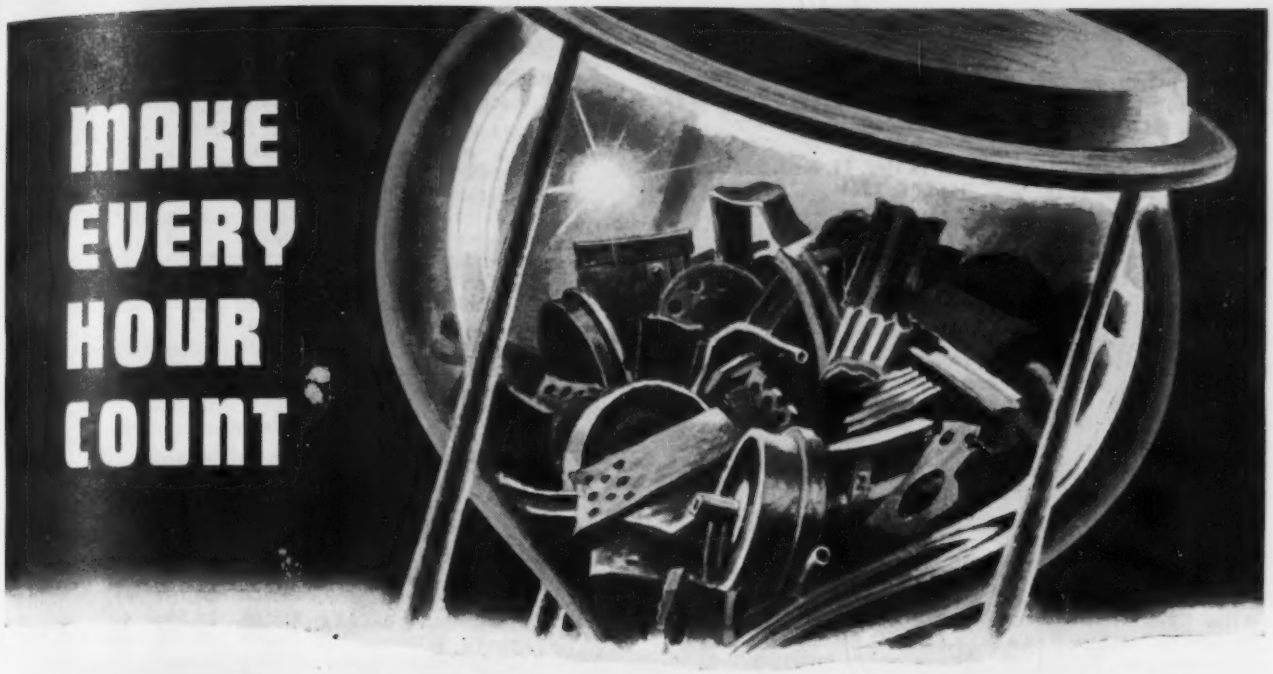
CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate, 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

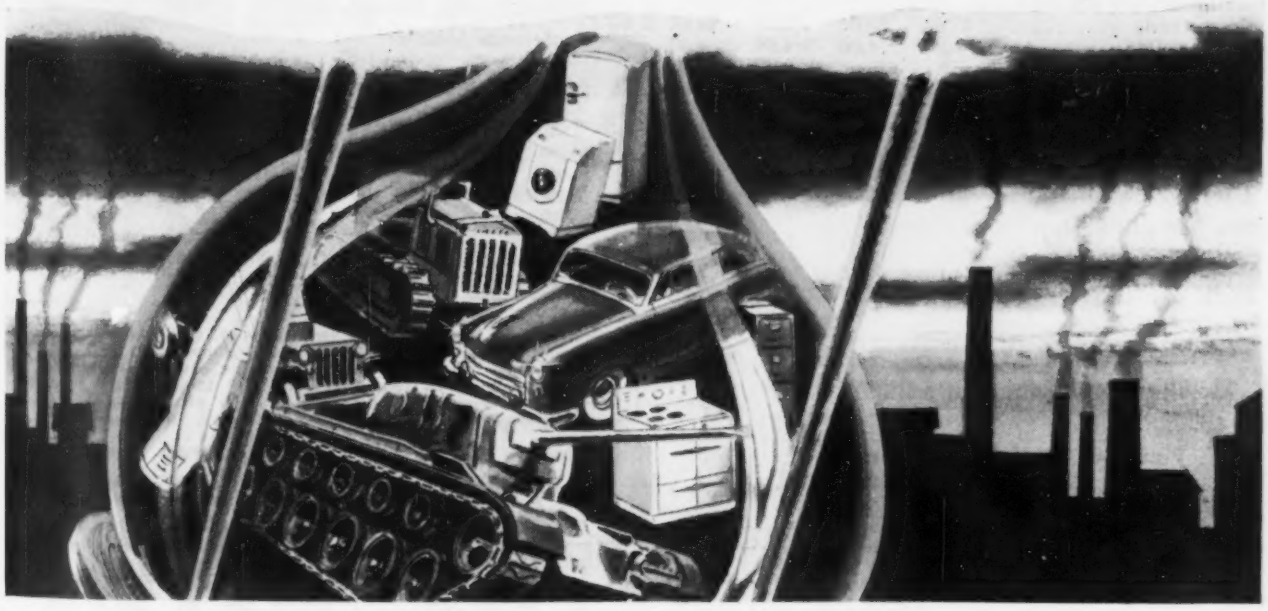
Hamilton, Ontario

(*Consumers buying prices, del'd gross ton*)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	38.00
Bushelings	30.00
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	32.00
Mixed borings, turnings	32.00
Cast scrap	55.00



KEEP SCRAP MOVING!



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Dec. 18, 1951	Dec. 11, 1951	Nov. 20, 1951	Dec. 19, 1950
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.50
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.25
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.85
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.60
Light rails	4.00	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Dec. 18, 1951	Dec. 11, 1951	Nov. 20, 1951	Dec. 19, 1950
No. 2 foundry, del'd Phila.	$57.97	$57.97	$57.97	$57.77
No. 2, Valley furnace	52.50	52.50	52.50	52.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	55.58
No. 2, Birmingham	48.88	48.88	48.88	48.88
No. 2, foundry, Chicago†	52.50	52.50	52.50	52.50
Basic del'd Philadelphia	57.09	57.09	57.09	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	181.20

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)	Dec. 18, 1951	Dec. 11, 1951	Nov. 20, 1951	Dec. 19, 1950
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$46.13
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	44.50
No. 1 steel, Chicago	41.50*	41.50*	41.50*	44.75
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	44.13
Low phos. Young'n	46.50*	46.50*	46.50*	48.63
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	67.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	62.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	65.00

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)	Dec. 18, 1951	Dec. 11, 1951	Nov. 20, 1951	Dec. 19, 1950
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	17.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.03†	$1.03	$1.03	$1.55
Zinc, East St. Louis	19.50	19.50	19.50	17.50
Lead, St. Louis	18.80	18.80	18.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	53.55
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	50.00	50.00	50.00	32.00

†Tentative.

Composite Prices

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)]

	Finished Steel Base Price	Pig Iron	Scrap Steel
Dec. 18, 1951	4.131¢ per lb.	$52.72 per gross ton	$42.00 per gross ton
One week ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One month ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One year ago	4.131¢ per lb.	52.69 per gross ton	45.13 per gross ton

	Finished Steel Base Price High		Finished Steel Base Price Low		Pig Iron High		Pig Iron Low		Scrap Steel High		Scrap Steel Low	
1951	4.131¢	Jan. 2	4.131¢	Jan. 2	$52.72	Oct. 9	$52.69	Jan. 2	$47.75	Jan. 30	$42.00	Oct. 23
1950	4.131¢	Dec. 1	3.837¢	Jan. 3	52.69	Dec. 12	45.88	Jan. 3	45.13	Dec. 19	26.25	Jan. 3
1949	3.837¢	Dec. 27	3.3705¢	May 3	46.87	Jan. 18	45.88	Sept. 6	43.00	Jan. 4	19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	32.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1932	1.89196¢	July 5	1.83910¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1929	2.31773¢	May 28	2.26498¢	Oct. 23	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$88.00[31]
Alloy, net ton	$70.00[1,17,6]	$70.00[1,4]	$70.00[1,6]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[3]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[18]	4.10[2,4,33]	4.10[6]	4.10[2]			4.10[6]		4.10[35]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[8,23]	3.60[1,6,9]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[18]		3.60[3]	4.00[26]		3.60[3]	4.30[22]	3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15,7]		4.35[1,6,8]	4.35[4,5]		4.35[7]	4.35[4,5]		4.35[3]			4.35[3]	5.05[22]	4.55[12]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[54]					4.80[3]	5.50[22]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[5]						5.35[22]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[54]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4,5]			5.40[1,4,13] 5.90[6]		5.40[3]	5.65[26]		5.40[3]		5.95[12]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[6]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[12]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9],4.00[41,58], 3.75[28] 3.50[5,7]	3.50[66]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[18]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[47] 3.80[12]
Cold-rolled	4.65[5,7,9] 5.00[28] 5.35[40,63]	4.90[8,66]	4.90[8]	4.65[2,5]		4.65[7]	4.65[4,6] 5.25[48,49] 5.35[13,40]		4.65[3]			4.65[3]		4.85[11] 5.45[47] 5.80[48,61]
Hi str. low alloy, h.r.	5.79[9]		5.50[1] 5.30[6,8],80[6]				4.95[4], 5.50[1] 5.40[13],5.80[6]		4.95[3]	5.55[26]		4.95[3]		5.95[12]
Hi str. low alloy, c.r.	7.20[9]			6.55[2] 6.70[5]			6.20[4], 6.55[13] 7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[32] 0.50 lb, add 25¢; 0.75 lb add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[18]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,22]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,8]		3.70[3,4]		3.70[3]			3.85[21]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4,8]		3.70[3,6]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,23,70]	4.55[4,74,73]	4.55[3]	4.55[4,52]		4.55[6,57]		4.60[70]					4.70[64] 4.80[106]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,23]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[8]	4.30[6,4]		4.30[3]			4.45[31] 4.65[12]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,23,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,32]		5.40[6,25,57]	5.40[3]	5.40[3]					5.55[34] 5.60[106]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,3] 6.05[6]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,23]	3.70[1,6,8]	3.70[4,5]			3.70[1,4,6] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[22]	
Floor plates	4.75[1]	4.75[1]	4.75[8]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8] 6.15[6]	5.65[4,5]			5.65[4] 5.70[13] 6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,23]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,8] 6.00[6]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[18]	4.85[2] 4.33,34		4.85[2]			4.85[6]	Kokomo=4.95[30] 4.85[35]			4.85[3]	4.95[3]	Duluth=4.85[2]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[8]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$62.00[82]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$66.00[11]	F=$85.00[19] SF, LS, S=$85.00[82]	Geneva=$66.00[16]	Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[82]		Alloy net ton
				Alton=4.40[32] Worcester=4.40[2] Minnequa=4.35[14] Portsmouth=4.30[30]	PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[2], F=4.90[19] LA=4.90[24,62]		WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[84], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.90[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Leng ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[81]	4.90[83]	3.50[4,11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[82]	Alton=3.95[32] Atlanta=4.05[65] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[2], 5.85[63] Trenton=6.00[45]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[62] S=6.30[82]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[24]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Alton=4.15[32] Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon stee
4.30[83]	4.10[83]	3.70[4,11]	SF, S=4.45[82] F=4.40[19], LA=4.40[82]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing
			LA=6.00[4]	Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[82] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19], SF, S=6.30[82] LA=6.25[82]	Claymont=4.15[29] Coatesville=4.15[21] Harrisburg=6.75[35]	Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[82]	Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=6.75[35]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19] S=6.55[82]	Geneva=5.65[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.60[4] 3.65[11]	SF=4.20[82] F=4.25[19] LA=4.25[24,62] S=4.30[82]	Geneva 3.65[16] Minnequa 4.10[14] Phoenixville=6.25[56]	SHAPES, Structural
		5.50[11]	S=6.10[82] F=6.10[19] SF=6.00[82] LA=6.05[82]	Geneva=5.50[16]	Si str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Alton=5.05[32] Atlanta=5.10[65] Worcester=5.15 Minnequa=5.10[14] Portsmouth=5.25[20]	MANUFACTURERS' WIRE Bright

† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128-lb. deduct $2.20 from 1.25-lb coke base box.

Key to Steel Producers

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calstrip Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., Alton, Ill.
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide, Mckeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel, San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville Ind
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.
105 Tonawanda Iron Div., N. Tonawanda, N. Y.
106 Pilgrim Drawn Steel Div., Automotive Materials Corp., Plymouth, Mich.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs billets rerolling	16.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs die blocks rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wires structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 4, 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 4, 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13 (type 301 add ¼¢); Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

*ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 Series.

WASHINGTON STEEL—Slightly lower on 300 Series except where noted.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv.(1) ¢/lb.
Alabama City-4	118	126		123		136	5.70	5.95
Aliquippa, Pa.-5	118	132			136	140	5.70	6.15
Atlanta-65	121	133		126	126	143	5.95	6.40
Bartonville-34	118	130		123	143	143	5.70	6.15
Buffalo-85							4.85	
Cleveland-86	125							
Cleveland-2							5.70	6.15
Crawfordsville-87		132				145	5.95	6.40
Donora, Pa.-2	118	130		123	140	140	5.70	6.15
Duluth-2	118	130		123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130		123		140	5.70	6.15
Houston-83	126	138				148	6.10	6.55
Johnstown, Pa.-3	118	130			140		5.70	6.15
Joliet, Ill.-2	118	130		123		140	6.70	6.15
Kokomo, Ind.-30	120	132		125	138	142	5.80	5.05
Los Angeles-62							6.65	
Kansas City-83	130			135		152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135				145	5.95	6.40
Moline-Ill.-4			136					
Pittsburg, Cal.-24	137			147	156	160	6.65	6.80
Portsmouth-20	124	137			147	147	6.10	6.60
Rankin, Pa.-2	118	130			140	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123		136	5.70	5.95
S. San Fran.-14				147		160	6.65	7.10
Sparrows Pt.-3	120			125	142	142	5.80	6.25
Sterling, Ill.-33	118	130		123	140	140	5.70	6.15
Struthers, Ohio-6							6.70	6.15
Torrance, Cal.-24	138						6.65	
Worcester-2	124						6.00	6.45
Williamsport, Pa.-51			150					

Cut Nails, carloads, base, $7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (26), Wheeling, W. Va. (15), $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago $105.30 to $108.80
6 to 24-in., del'd N.Y.... 108.50 to 109.50
6 to 24-in., Birmingham 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less .....$123.00 to $130.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Cleveland-3						9.35		
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.70	6.15	5.60		4.50	9.85
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.60		4.50	
Johnstown-3		4.00			5.60			
Joliet-1		4.00	4.70					
Kansas City-83				6.40				9.85
Lackawanna-3	3.60	4.00	4.70				4.50	
Lebanon-3				6.15		9.35		9.85
Minnequa-14	3.60	4.50	4.70	6.15			4.50	9.85
Pittsburgh-3						9.35		
Pittsburgh-77						9.35		9.85
Pittsburgh-78								9.85
Pittsburgh-5				6.15				
Pittsburgh-24							4.65	
Seattle-62				6.65			4.65	
Steelton-3	3.60		4.70				4.50	
Struthers-6				6.15				
Torrance-24							4.65	
Youngstown-4				6.15				
Cleveland-4						9.35		

BOILER TUBES

$ Per 100 ft. cut, 10 to 24 ft

F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.98
	2½	12	30.48	35.84	29.57	34.78
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.88	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.82	26.48		
	2½	12	29.65	36.32		
	3	12	34.00	41.64		
	3½	11	40.34	49.41		
	4	10	51.21	62.72		
Pittsburgh Steel	2	13		27.08		
	2½	12	30.40	37.15		
	3	12	34.95	42.59		
	3½	11	41.48	50.54		
	4	10	52.65	64.18		

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $41.00
60% or less 40.00

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	3½-4 In. Blk.	3½-4 In. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0						
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0						
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton, Ill.-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0						
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5		34.5	
Wheeling-15	36.0	14 0	39.0	18.0	41.5	21.5	42.0	22 0	42.5	23.0	43.0	23.5	43.5	24.0						
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22 5						
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23 0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0						
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24 0	43.0	24.5	43.5	25.0						
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0						
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
Alton, Ill.-32	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0						
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0						
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0		36.5	
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42 0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42 0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 19.50¢.

Miscellaneous Prices

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢.)

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.84	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.66	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.57	6.44	7.39	.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.39	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[3]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[3]	6.60	9.95[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	8.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.38	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise, keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanizing sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	57.00	57.50	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Manassas-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-28	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....
N. Tonawanda, N. Y.-105	.....	52.50	53.00	.....	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base.(1.75 to 2.25 pct, except low phos.,1.75 to 2.00 pct., 50¢ per ton for each 0.50, pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick — *Per Net Ton*

Standard chemically bonded, Balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite — *St. ⅛-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed $62.70
Domestic, f.o.b. Chewelah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.75

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*) — *Per gross ton*

Old range, bessemer $8.70
Old range, nonbessemer 8.55
Mesabi, bessemer 8.45
Mesabi, nonbessemer 8.30
High phosphorus 8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.80	7.40	9.35	11.65

Miscellaneous Prices

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg.	K.	Less Keg.	K.
	Reg.		Hvy.	
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished	48—10
Packaged, plated finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets — *Base per 100 lb.*

½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b., mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn., Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*27.50
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, In East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd.	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15		7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28		7.25	8.50	9.30	9.85		
Follansbee-62	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22		7.95	9.20				
Ind. Harbor-3	6.75	7.25					
Mansfield-75	7.25	7.75	9.00	9.80			
Niles, O.-64	7.05	7.55					
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50
0.10% C	30.00
0.15% C	29.75
0.20% C	29.50
0.50% C	29.25
1.00% C	29.00
2.00% C	28.75
65-69% Cr, 4-9% C	22.00
62-66% Cr, 4-6% C, 6-9% Si	23.00

Foundry Ferrochrome

Contract prices, cents per lb of alloy Noncontract prices add 0.25¢ per lb.

High carbon 8 mesh and down.

62 to 66% Cr, 5 to 7% C, 7 to 10% Si.

Carloads, bulk	23.25
Carloads, packed	24.15
Ton lots, packed	27.25

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.14
0.50% max. C	1.10
9 to 11% C	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

—Ferroalloy Prices—

Ferromanganese

78-82% Mn maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	75.00	76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn.....19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

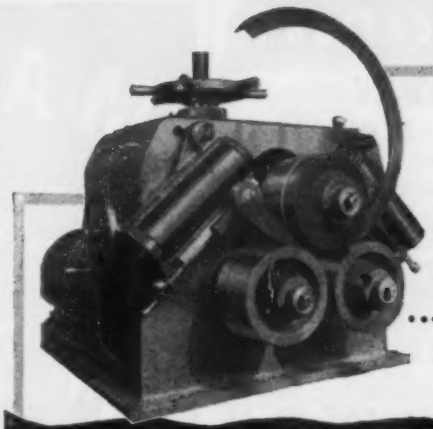
Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.75% max. C, 90% max. Si	24.25	26.10	27.30
	21.25	23.10	24.30



If you have only 1 angle to roll, you won't need it!

...BUT FOR PRODUCTION ROLLING, IT'S A "MUST"

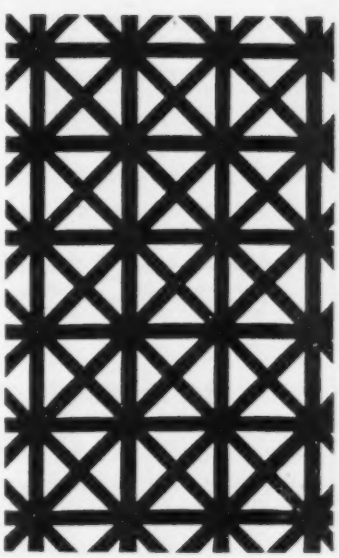
THOMAS ANGLE-BENDING ROLL

Obviously one, two, six or even sixteen angles won't justify the purchase of this modern Thomas machine. But if your production calls for circles or segments from angles, flats, rounds or other shapes in quantities, the THOMAS ANGLE BENDER may be the solution to *your* need for *greater production at less cost!*

BULLETIN 314 *describes the four sizes and is yours for the asking. Write for it now!*

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, 23, PA.

Hendrick Ornametal
TRADE MARK



This is a lightweight type of grille especially suited for radiator enclosures, stove panels, kitchen cabinets, clothes and broom closets, lockers, and similar applications. It is made of a special bright finish, cold rolled steel, suitable for painting or plating, and is available in a wide range of stock size sheets and gauges.

Hendrick Ornametal can be furnished in a variety of attractive designs, the one illustrated being "Smalcane." Write for full information.

1876—Seventy-Fifth Anniversary—1951

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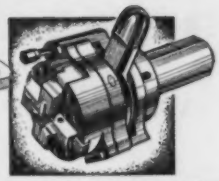

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Office of Price Stabilization has heard demands of the used machinery trade for a price guide book for new machine tools on which to peg ceiling prices of the OPS order (CPR 80).

The agency expects to undertake shortly preparation and issuance of the price book. Cooperation of the industry is arranged for. Prices are reportedly already accumulated. Representatives of the trade favor the project, OPS was told. They have pointed out to pricing officials the importance of including in the book methods for establishing relationships of new tools to obsolete and discontinued models of used equipment.

Obsolete Tools—OPS is getting other valuable advice from the trade. An industry committee meeting with OPS recently suggested that it would be practical to eliminate ceilings for obsolete machine tools having only nominal value. The group proposed that tools in this class, having a value of less than $300, be dropped from price control.

OPS has also been asked to alter the base date of Jan. 25, 1951, for determining price ceilings. A more recent date is desired to achieve a more realistic pricing set-up between new and used tools. Argument of the committee was that prices of the new had risen appreciably since the base date and it was an inequity to tie used prices to ancient history.

The group contended that current prices have leveled off and are now comparatively static.

ARA Meets—Washington's Mayflower Hotel was resplendent with the glitter of high military brass recently at a meeting of the American Rebuilders Assn.

The fledgling association estimates there are from 250,000 and 300,000 machine tools in dealers' hands and in industry which can be rebuilt to standards.

J. M. P. Fox, formerly with MDNA and now executive vice-president of ARA, says he is "endeavoring to protect the interests of this small group (rebuilders) in Washington." He also says that the ceiling price regulation on used tools "penalizes the rebuilder to standards and favors the dealers in used machinery and equipment" who can't do such a thorough job.

The dealers who "can't do such a thorough job" think just the opposite and are always prepared to point to rebuilding and reconditioning clauses in CPR 80.

Christmas Spirit—Some of the steam missing from used machinery markets is not due only to drawbacks of price controls, members of the industry admit. December is traditionally a slow turnover month. Christmas spirit, days off, rounding out production schedules by manufacturers, year-end inventory combine to make trading lazy.

Pick-up in business is expected in January. Some dealers believe that 1952 will be a good year for used machinery. They point to subcontracting spreading out to many more small firms under the impetus of heavier and heavier defense spending.

Training Ground—National Service Industrial Assn. complains that its field is suffering from a shortage of skilled and experienced men from management to shop level. NISA reported it had a training course, Electric Motor Repairman Training, which is being offered through International Correspondence Schools.

NISA admits that some employers are not too enthusiastic about training because the men who take on new skills would soon be job-hunting. The motor repair industry serves as a training ground for industrial maintenance.

NISA's problem is to train men faster than outside demand for them develops.

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